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TRANSACTIONS

OF THE

Mississippi Valley Medical Association.

TWENTY-SIXTH ANNUAL SESSION

HELD AT

ASHEVILLE, N. C., OCTOBER 9, 10 AND 11, 1900.

VOLUME II.

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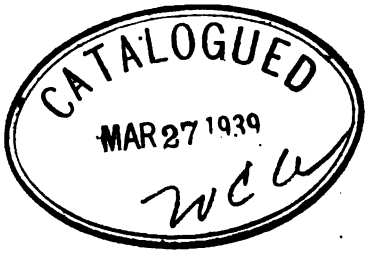

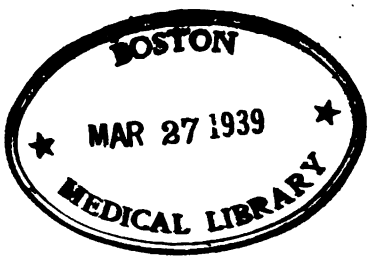

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CONTENTS.

PAGE.

List of Officers for the Year 1900 vii
List of Officers for the Year 1901 viii
List of Officers Since Organization ..... ix–x
President's Address, Harold N. Moyer, M. D., Chicago, Ill 1
Address in Surgery, by C. A. Wheaton, St. Paul, Minn .. 11
Address in Medicine, by I. N. Love, M. D., New York, N. Y 21
Special Article. The Recent Advances in Medicine. Compiled by Samuel F. Brothers, M. D., New York, N. Y 40

Papers:

I. Vaginal versus Abdominal Hysterectomy. By H. O. Walker, M. D., Detroit, Mich 55
II. Cancer of the Uterus and its Treatment. By R. Stansbury Sutton, M. D., LL. D., Pittsburg, Pa 60
III. Tracheloplasty. By Henry Parker Newman, A. M., M. D., Chicago, Ill 75
IV. Post-operative Internal Hemorrhage. By A. H. Cordier, M. D., Kansas City, Mo 87
V. The Treatment of Adherent Cysts of the Ovary and Broad Ligament by Incision and Drainage. By J. E. Allaben, M. D., Rockford, Ill. 101
VI. Ventral Hernia following Laparotomy. By B. Brindley Eads, M. D., Chicago, Ill 106
VII. The Relation between Appendicitis and Gallstones. By A. J. Ochsner, M. D., Chicago, Ill. 120
VIII. Cocaine Anesthesia of the Spinal Cord. By Carl H. Andersen, M. D., Chicago, Ill 132

PAGE.

IX. Notes on Fractures Contiguous with or Involving Articulations of the Larger Bone Shafts. By Thomas H. Manley, M. D., New York, N. Y..... 145

X. Medical and Surgical Treatment of Acute and Chronic Cervical Lymph Nodes. By H. Horace Grant, M. D., Louisville, Ky..... 161

XI. A case of Intermittent Hydrops of the Knee. By George W. Cale, Jr., M. D., F. R. M. S., Springfield, Mo..... 172

XII. Perfect Recovery following Gangrene of the Scrotum and Penis. By Everard Hamilton Richardson, M. D., Atlanta, Ga..... 178

XIII. Observations Gleaned from Some Recent Cases of Mastoiditis. By Geo. F. Keiper, A. M., M. D., Lafayette, Ind..... 182

XIV. Middle Ear Disease in Relationship to Cranial Cavity. By Otto J. Stein, M. D., Chicago, Ill. 185

XV. Syphilis without Chancre. By W. Frank Glenn, M. D., Nashville, Tenn..... 210

XVI. The Gonococci in the Gonorrheal Secretion. By A. Ravogli, M. D., Cincinnati, Ohio..... 212

XVII. The Treatment of Peri-rectal Abscess. By John L. Jelks, M. D., Memphis, Tenn..... 222

XVIII. Simple Operation for Hemorrhoids. By J. Rawson Pennington, M. D., Chicago, Ill.... 225

XIX. Diseases of the Sigmoid Colon. By William V. Laws, M. D., Philadelphia, Pa..... 236

XX. Obstipation. By Sterling B. Taylor, M. D., Columbus, O..... 245

XXI. Revelations of the Proctoscope in Health and Disease. By A. B. Cooke, A. M., M. D., Nashville, Tenn..... 265

XXII. The Treatment of Tuberculosis of the Spine. By Alex. C. Wiener, M. D., Chicago, Ill.... 273

PAGE

XXIII. The Treatment of Tubercular and Purulent Hip-joint Diseases with Large Glass Speculum Drainage and Pure Carbolic Acid. By Alex. Mix Phelps, M. D., New York, N. Y..... 282

XXIV. Pulmonary Tuberculosis in Infancy and Childhood. By Frank Parsons Norbury, M. D., Jacksonville, Ill..... 300

XXV. The Growing Necessity for Sanatoria for the Tubercular. By William Porter, A. M., M. D., St. Louis, Mo..... 316

XXVI. The Physician as a Sanitarian. By Hugh A. Cowing, M. D., Muncie, Ind..... 324

XXVII. The Prevention and Management of Infection of the Breast During Lactation. By C. S. Bacon, Ph. B., M. D., Chicago, Ill..... 333

XXVIII. The Girl at Twelve. By James H. Taylor, M. D., Indianapolis, Ind..... 344

XXIX. The Curability of Inebriety by Medical Treatment. By T. D. Crothers, M. D., Hartford, Conn..... 354

XXX. Further Observation on the Clinical Application of the Supra-renal Capsule. By W. H. Bates, M. D., New York, N. Y..... 365

XXXI. The Clinical Value of Purgative Mineral Waters. By Edwin Rosenthal, M. D., Philadelphia, Pa..... 377

XXXII. Erichsen's Disease; Does it Exist? By Isham H. Goss, M. D., Athens, Ga..... 389

XXXIII. What the Law Requires of a Surgeon. By Dudley S. Reynolds, A. M., M. D., Louisville, Ky..... 398

XXXIV. Asthma. By R. Alexander Bate, M. D., Louisville, Ky..... 405

XXXV. Differential Leucocytosis. By L. H. Warner, A. M., Ph. D., M. D., Brooklyn, N. Y..... 413

PAGE.

XXXVI. The Philosophy of the Science and Art of Medicine. By William F. Barclay, M. D., Pittsburg, Pa..... 421

XXXVII. Infantile Malaria. By William Britt Burns, M. D., Deckerville, Ark..... 436

XXXVIII. The Determination of Sex. By William O'Neal Mendenhall, M. D., Richmond, Ind..... 443

MINUTES OF THE TWENTY-SIXTH ANNUAL MEETING, ASHEVILLE, N. C., 1900..... 447

CONSTITUTION AND BY-LAWS..... 462

ROSTER OF MEMBERS..... 467

LIST OF MEMBERS DROPPED FOR NON-PAYMENT OF DUES..... 474

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Next place of meeting, Put-in-Bay, Lake Erie, Ohio, September 10, 11 and 12, 1901.

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1887	I. N. Love, St Louis, Mo.	Jos. Robbins. Quincy, Ill.	Jacob L. Geiger, St. Joseph, Mo.	J. L. Gray, La Porte, Ind.	A. O. Dumesnil, St. Louis, Mo.	Crab Orchard Springs, Ky.	Dudley S. Reynolds.

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1900	Harold N. Moyer, Chicago, Ill.	A. H. Cordier, Kansas City, Mo.	S. P Collings, Hot Springs, Ark.	do	do	Asheville, N. C.	M. H. Fletcher.

*Deceased. (R) Reisgned.

NOTE.

The Association assumes no responsibility for the views expressed in the papers read at its meetings. A special article has been added to this volume, which brings it down to date, as a reference work, and adds to its value.

HENRY E. TULEY, M. D., *Chairman*,
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PRESIDENT'S ADDRESS.

BY HAROLD N. MOYER, M. D.,

CHICAGO, ILL.

In casting about for a subject for the Presidential Address it first occurred to me that I would choose a scientific topic, but later that was dismissed, as such matters are best handled on the floor of the Association, with full opportunity for discussion. The Presidential Address should concern itself especially with those matters of general interest which affect the welfare of the profession and the relations of its members to one another and the community. It is to a few topics of this sort that I shall direct your attention. I shall not take this opportunity to wash any of our dirty linen, as I believe this function is best subserved by the local professional laundry. I shall not imitate my illustrious confrere, who, at the meeting of the great International Medical Congress, held in Paris, being chosen to speak for the profession of America, made a general apology for its very existence. Not content with a general apology the address descended into particulars of the New York code question, of malodorous memory—a question time-worn and exhausted and purely local, embalmed in the records of an International Medical Congress! The medical profession of this country needs no apology. The September 22d issue of *The London Lancet,* in commenting editorially on the above address, in speaking of the peculiar legal position of practitioners in this country, says: "Such are the disadvantages of the medical profession in a new country having Democratic institutions based on an exaggerated view of the rights of the individual in regions where he can have no rights not acquired by study and special knowledge. But such disadvantages can only raise our esteem for those who, prevailing over all difficulties, have brought the medical

profession to a pitch of efficiency, alike in the region of research and the domain of practice, which compares favorably with the standard of any European country.

"The number and competition of the schools, of which in 1899 there were 156, with 24,119 students, having a very inadequate check on their degree-conferring powers, only makes us wonder the more that within recent years it has been possible in many States to extend the medical curriculum to three or four years and to report through societies and journals an amount of good work which implies a very high standard of education in some quarters and a very high pitch of medical and surgical ability diffused throughout the enormous area of the United States." In the light of the above quotation we feel the defense of the American medical profession can safely be left with *The Lancet,* than which there is no more fearless and impartial critic. All that we need to do is to apologize for the representative appointed to speak for us.

A statement in the same address says there are too many medical societies. In this we cannot agree. We are told that in Colonial times there were but two medical societies, while in 1876 every State and most counties had a medical society. I believe there is no medical society in this broad land, be it ever so obscure and insignificant, but is doing yeoman service for medicine. Its contributions may not echo along the Atlantic seaboard, but wherever medical men are gathered together and earnestly strive to solve some medical problem, there is the germ of professional progress.

I have quoted *The Lancet's* astonishment at the medical progress in this country with the conditions which prevail here. To my mind the most potent, far-reaching, and, I believe, almost the only influence that has lifted American medicine to the position it now enjoys is the medical society. In this country we have almost no endowment of medical education or research, no governmental subsidy, no paid hospital staffs, and yet we are said to rank high in our achievement. In no other country are medical societies so numerous and so well attended. Abroad they are for the few; here they are for the many, and it is to their collective voice, speaking in no

uncertain tones, that we owe the uplift in medical education. Everywhere they disseminate the scientific spirit, add cohesiveness to the profession, and tend to its elevation. By concerted effort the profession is able to do for itself what in Europe must be done by legislation and subsidies. Success to all medical societies where earnest men are gathered together and an effort is made to do good work! There will never be too many, for they are only voluntary associations which, as long as they subserve a useful purpose, will live, but when no longer needed they will die.

Take your own Mississippi Valley Medical Association. It is said to represent no definite geographical boundary, to have a name, but no local habitation. Has it done good or poor work? Has it improved or deteriorated? I invite your attention to the program which we are to discuss at this meeting; compare it with that of five years ago, and note the growth. No society better illustrates the natural development of such associations; in response to the needs of the hour it gradually expanded. Some say there is no place for this society, and its influence is detrimental to the larger organization, the American Medical Association. Such assertion is clearly disproved by the fact that all of its leading members are enthusiastic supporters and active workers in the national body. Instead of its being antagonistic, it is a most important auxiliary of the national body, a sort of recruiting station.

He who says there are too many medical societies reads the signs of the times but imperfectly. To him who longs for the subsidy and the fostering care of the old world, we would point to the present achievement of Democratic institutions. We firmly believe that America is destined to a brilliant future, in which art, science and letters will reach the highest excellence. In this triumph medicine is destined to share, and the results will be none the less brilliant because she is compelled to work out her own salvation. We do not need, nor do we ask, special privileges under the law; all we desire is that measure of protection accorded all good citizens in the exercise of their calling.

Another and very fitting topic at this time is the relation of

the profession to the law. The matter of medical legislation is a delicate one from a professional standpoint. The passage of medical practice acts has been urged by the medical profession and we have been distinctly misunderstood in our attitude towards such legislation. There is a feeling in the community and on the part of legislators that in some way the medical profession wishes to put a fence around the practice of medicine in order that those who are on the inside may fatten. It is persistently charged that we wish to create a medical oligarchy, to which only the few shall be eligible. For selfish reasons it is said that we desire to limit the number of medical men to the end that we alone may occupy the chosen field. To the credit of the better elements in the community it must be said that such charges largely emanate from those whose interests are identical with the diploma mills and the various forms of quackery. The profession urges medical legislation not from selfish and interested motives, but in the interests of the public health. At no time has it ever desired legislation which shall limit the number of medical men, but it has insisted that those who pose as practitioners of the healing art should be in effect what they claim, masters of medical science. The government licenses pilots and engineers, in the interests of the public. We merely point out that the same precautions should be taken in protecting the individual life that are taken for the many. It is the duty of government to ascertain the qualifications of medical men who pose as qualified practitioners. This is the attitude of the medical profession upon this question; and so far as we are personally concerned we would rather there were no medical practice acts, because they are not necessary for our protection, but simply for the protection of the public. We fear that this conception of a medical practice act is not held by a small minority of the profession, and it is one of the stumbling-blocks in the way of medical legislation; preventing that unanimity so necessary for effective action. The aim in some instances has been to protect the profession, and not the public. Such legislation is foredoomed to failure, as it must of necessity be unconstitutional. In framing a medical practice act

and urging its passage, you can do so only upon the issue that it is good for the public health, not that it protects the profession.

Medical practice acts have not generally been all that was hoped for, largely due to the fact that they were imperfectly drawn and did not recognize the basic principles that should obtain in such legislation. One of the crying needs of the near future is a careful study of the whole question of medical legislation.

There is a practical point which I would especially urge upon the Association at this time, namely, that some consideration be given to the formation of a national committee that shall study the question of medical statutes and decisions bearing upon it, so that light may be thrown upon any question that comes up in relation to it and to enable the people to have data upon which to formulate these acts. It should be taken up by one of the national bodies and all of the conditions to be met in such legislation earnestly discussed. Their business should be to accumulate and codify all decisions bearing on such acts, together with a record of the effectiveness of given legislation. Such a body would be able to advise legislators and those urging the passage of medical laws. It, too, might secure some degree of uniformity in different States and possibly lead to reciprocity in registration, by which a practitioner once on the list could be admitted to practice in States having equal requirements.

It is now generally admitted that the licensing power should be separated from the degree-conferring faculty. Many of the States have examining boards, and it is generally believed that if a medical act does not go beyond the appointment of such a body, a long step has been taken in the interests of the public health. All sorts of regulation of the college curriculum, and the recognition of colleges in good standing are worse than useless. The diploma fetich must be once and for all destroyed. This accomplished, the results which accrue depend largely on the manner in which the laws regulating practice are enforced. Here has always been the difficulty, and the chief stumbling-block has been the defective-

ness with which medical acts have been drawn. If such acts are framed with a view to keeping men out of their chosen calling with the idea of protecting the few who are already in the fold, nothing can be accomplished, but if the laws are framed solely in the interests of the public health, it will generally be found that they can be enforced. In drawing such acts a few principles must be kept in mind, namely, that the practice of medicine was originally a common law right; anyone choosing to do so could succor the afflicted and be compensated for his services. The license to practice medicine is in effect an inhibition of a common law right, and does not confer on its possessor a franchise, something that he did not originally possess. The purpose of a medical practice act is twofold, one is to test the qualifications of medical men, and this is accomplished by the examining board. In some instances we fear that these have been inefficient and sometimes it is charged that "pull" has more to do with putting a man on the register than knowledge. Secondly, the law should protect its registration and prevent the illegal practice of the healing art. In this second function medical practice acts have proven woefully deficient. In part this is due to the fact that they sometimes wish to prohibit mere vagaries of the mind, such as Christian Science. I have a perfect right to employ someone to sit with his back to me and think or pray my diseases away; no one in his proper senses would call such a procedure practicing medicine. The same could be said of a faith healer, though one Illinois justice came to the conclusion that the laying-on of hands practiced by one of these fellows came within the limitations of the medical practice act.

As a rule in seeking to limit practice to qualified men, the terms of the statute are too specific. As a rule, the practice of medicine is defined *"as the treatment of or operating upon anyone afflicted, or the giving of any material, drug or thing for the cure of any diseased person."* Such a definition is a great source of weakness. In every case the definition must be made to apply to the particular circumstances in a given case; it also gives ample opportunity for a studied evasion

of the act. If such an act is drawn in general terms with a few brief clauses, it is greatly strengthened. The prohibition should simply extend to forbidding the practice of medicine, thus in effect leaving it to judge and jury to determine in the particular case whether the person was practicing medicine. There is a fairly clear notion in the lay mind as to what constitutes medical practice and while the rule might not be always applied alike to the same set of facts, yet it would be much more effective in checking unlicensed practice.

I hope the Mississippi Valley Medical Association in connection perhaps with the American Medical Association will urge a further study of this whole subject.

Referring again to the address which I have already quoted from *The Lancet*, not only were we charged with having too many medical societies, but we were likewise charged with having too many medical journals. I do not know whether this is true or not. Perhaps I ought not to speak on this subject, because I have one of my own. I doubt if we have more medical journals than they have in France in proportion to population and size of the profession. Certainly our medical journals are up to the average of those of France, and they are pretty nearly up to the average of those published in Germany. The American medical profession sees only a few of the foreign journals, such as *Le Progres Medicale, Semaine Medicale, La Presse Medicale,* etc., but these are the leading journals of France. Of the German medical journals our profession sees the *Berliner Klinische Wochenschrift, Deutsche Medicinische Wochenschrift,* etc., and *The London Lancet, The British Medical Journal, The Practitioner,* etc., of England. They do not see the whole list of advertising, nostrum-fostering journals that we seem to be so peculiarly afflicted with. They have them in foreign countries, but they do not come to this side of the water. It is true that many of our medical journals recommend what are practically patent medicines. Too often they publish special pleas in the interest of drug houses; they review books by printing the letters the publishers send with the books; and they are full of sins of omission and commission, and yet the medical jour-

nal can be safely left to look after itself. When medical journals become worthless they will not be read. The poor ones are not influential. Taking medical journalism on the whole, it is well represented in this country by our leading journals, which take a high place among medical publications. We have medical journals that are edited by men of honor, upon honorable principles, and if you went into their offices and asked them to do something dishonorable the probabilities are that you would be kicked downstairs. These men are editing the leading medical journals of our country and are supported earnestly by the profession. The fact that there are medical journals published of which this cannot be said does not detract from their excellence.

There is another thing that I am going to talk to you about, and one which is near to my heart. I refer to medical specialism, and I feel if anything can be said in criticism upon the medical profession of this country, it would be leaning toward specialism.

A week before I came to this meeting a medical student in his first year came to my office. I supposed that he wanted me to prescribe for him, and I said, "What is the matter with you?" He replied, "There is nothing the matter with me, but I have come to ask your advice as to what specialty I had better take up." (This young man is entering upon the first term of the Freshman year.) I said to him, "My dear boy, there is something very much the matter with you. You need a prescription and need it badly." This young man only reflected a phase of what we see every day, not only in our medical colleges, but in the profession, namely, an overweening inclination toward specialism. Specialism is a great thing in medicine. It has done vast things for the science but it may be overdone. We cannot make any sweepng condemnation of specialism here; a statement of the evils of it would be only a partial indictment. There is not a good thing in this world of which evil cannot be predicated. Could I stand here and say that individual liberty, self-government. and government by the ballot are all wrong? There is not one of you who would not decry the evils connected with the

ballot, and yet occasionally an intelligent man says that he will not go to the polls to exercise his franchise because the ballot is in the hands of those who misuse and abuse individual liberty. And so specialism is a great thing in our profession when practiced within reasonable limits. It may be carried too far and may be misused. There are proper specialists and specialties, but without thorough education, without thorough training in general practice, no man is a good specialist. I am speaking now of specialties proper, and not specialties of diseases of the heart, of the lungs, or of the kidneys. No one can properly make a specialty of either one of these organs because they must be taken together. The eye and ear are specialties only in so far as they involve special skill of technique in operating and treating patients. The general practitioner must be a good diagnostician in eye diseases, but he may not be skilled in the manipulative methods required in these specialties. As illustrating the narrowness of specialism I want to mention a case in point: A patient came into my office with a facial palsy. I looked at her and saw that her pupil was dilated, and asked who sent her. She said she had been at an eye and ear clinic. "Very well, what did they do? Did they notice that your face was paralyzed?" She said they looked into her eye and then sent her down to me. On examining the ear I found otitis media, which was the cause of the facial paralysis. That is what specialism is doing in that great institution. She could not close her eye and was referred to the eye clinic. The oculist dilated the pupil, examined the eye, and saw nothing the matter with it. I sent her back to the clinic to the ear department. There seems to be no bridge across the eye and ear in that institution. This is an illustration of what specialties may do. However this matter of specialism will take care of itself. It carries its own cure and even now the signs are already out, because I note in the catalogues of several medical schools that there is a professor of general medicine. I picked up a sanitarium prospectus the other day and the first five names headed the list as consulting specialties. Specialists in what? General medicine. What is a specialist in general medicine?

A general practitioner, of course, so that the cure is already being applied. Perhaps it would not be profitable to spend any more time on the subject of specialism, but I would urge upon those of you who are teachers, so far as you can, to raise your voice in colleges and before medical societies to urge the younger men in our profession not to be seized with the fad of specialism, but instruct them that they should acquire that broad general culture which can only come from general practice, and if circumstances and opportunity so point that they drift into a specialty, let it come naturally, without being forced.

I fear that I have trespassed too much upon your time, and I will close by thanking you again most earnestly for the honor which you have conferred upon me in making me the president of the Mississippi Valley Medical Association.

ADDRESS IN SURGERY.

FULMINATING APPENDICITIS.

BY CHARLES A. WHEATON, M. D.
ST. PAUL, MINN.

MR. PRESIDENT AND GENTLEMEN OF THE MISSISSIPPI VALLEY MEDICAL ASSOCIATION:

You have done me the honor to make me essayist on surgery at this meeting. For the sake of my auditors I wish this function might have fallen into more worthy hands, but with you lies the responsibility and I will do my best to merit your approval. The custom of the day is for the writer of such an essay to philosophize upon the surgery of the past, present or future, or to offer an epitome of some surgical procedure of common interest or offer some contribution, scientific in character, which shall add to the enlightenment of his craft and the welfare of mankind, to whom his life labors are consecrated.

The greatest enemies of the race today from a medical as well as surgical standpoint are probably cancer and tuberculosis. All the world over both for many years have received, still are receiving and no doubt will continue to receive, attention at the hands of the scientific workers qualified to deal with matters of such great importance. Both are omnipresent and are stalking among us night and day, torturing the body, disturbing the domestic peace, not only of families, but of communities, nay, even of nations, jeopardizing the longevity of the race and begetting a progeny poorly caparisoned, physically, to discharge the obligations of the coming generations. The beneficent influence of our labors in opposing the onward march of these ghoulish pursuers is more and more apparent as the months go by.

The ideal surgeon of the future will be possessed not only of the qualities of heart and hand, which in association, make

good surgical timber, but will also be so well grounded in surgical pathology that his microscope will be the satellite of his knife in its various missions of mercy and the combination will, I feel sure, take us nearer the surgical millennium, and will minimize the opprobrium attaching to mistakes because they will be fewer. He will shield the hopeless subject from needless mutilation and give to others the fullest measure of protection. The past half century will go down in history as the grandest fifty years of medical progress in all the ages. The names of Morton, Sims and Lister will become immortal and will continue to shed the radiance of their glorious achievements for all time in the field of surgery.

The vastness of the territory made possible for cultivation by the labors of these men is incalculable and the majesty of their achievements will grow with advancing years.

At the risk of incurring your disapprobation I have selected as a theme for your consideration a subject which will seem to many of you trite and threadbare, but which to me carries with it the largest measure of danger to its unfortunate victims, of any of the acute surgical diseases. A review of the transactions of this Association held in Chicago a year ago furnishes proof of the importance of the disease in question, in fact the reviewal of the transactions of the deliberative bodies in medicine and surgery the world over impresses upon us the fact that this disease is a subject of constant, solicitous reflection in the minds of the great men in surgery and medicine in all the nations. It is needless for me to say that I refer to appendicitis; but I would deal in this brief article only with that form of appendicitis which we recognize as the "fulminating form."

I know of no acute surgical condition so fraught with danger to the patient and disappointment to the surgeon as this particular disease. I know of none other where early recognition and intelligent handling from a surgical standpoint, offers as great a regard for the labor expended. Ever since Willard Parker first incised the iliac fossa for appendiceal abscess, and Fitz gave to the medical profession an intelligent

interpretation of the symptoms associated with inflammation in the right iliac fossa in the territory of the caput soli, this subject has received constant and painstaking study. The license given to the operating theater by anaesthesia and the freedom from surgical infection made possible by our knowledge of bacteriology has, I think, contributed much to the unfriendly, undignified and unjust criticism of the lay as well as the professional press. There are teachers of international reputation who advocate the removal of the appendix in every case in which the diagnosis is established, and to most of the surgeons of large experience I think this seems the safest solution of the question.

It savors a little of the ridiculous when scientific bodies of this character seriously deliberate upon the wisdom of prophylactic appendectomy as a means of protecting the human family from possible appendicitis in the years to come. We know that the proportion of inflamed appendices in the race as a whole is comparatively small, and that any surgeon would seriously contemplate sitting at the maternal outlet to seize and eviscerate the offspring immediately upon its escape from the mother's womb, seems hardly credible, and yet there are those who have seriously considered the wisdom of such a procedure.

I do not intend to attempt a disquisition on the subject of appendicitis in general, but to confine my remarks solely to that form of appendicitis which almost always in a few hours, if allowed to go unopposed, consigns its unfortunate possessor to the grave. I believe with the rarest exceptions, that every case betrays in its clinical aspect sufficient warning for the properly educated and trained surgeon to form a correct opinion as to its probable outcome.

One of the most distinguished authors and teachers in the country not long since made the announcement that eighty per cent. of all cases of appendicitis would recover without operation. Ten years ago one of the most widely celebrated authors in medicine, said in his writing on this subject, that ninety-five per cent. of these cases would recover under opium

treatment. The folly and the injury of both these statements grow in their enormity when we analyze carefully what they mean.

The surgeon in question knows that not three percent, and in all probability less than one per cent. of the cases of the character to which I refer, would recover unaided by surgical interference, and, the medical writer who made this startling announcement that ninety-five per cent. would get well under opium knows, or ought to know that he could not contribute more to the destruction of his patients than by putting into practice the theories he advocates in cases of this character.

It seems to me that the question is beyond argument. Suppurative peritonitis is almost without exception the result in fulminating cases, a result which is attained anywhere from twelve to seventy-two hours from the time of the attack; and if not recognized and treated medically inevitably results in death, and on the other hand, if recognized and scientifically handled surgically, will yield a mortality of less than fifty, and probably not less than twenty per cent.

Almost every day I see the justice of the comments of an American surgeon some years ago when he discussed this question. He said: "Appendicitis is distinctly a surgical disease"; and I firmly believe that if the workers in the field of internal medicine could be brought to so consider it and would surrender their cases to the hands of the competent surgeon, they would not materially lessen their prestige and would materially contribute to the welfare of their clients. I do not believe that any case is so desperate unless the death struggle is actually on, that we should refuse to make an effort for relief.

Nearly twenty-five years ago, when I was a student in an eastern hospital, I saw my distinguished teacher, Dr. David W. Cheever, of Boston, make an incision into the abdominal wall for the purpose of draining a suppurating abdominal cavity. We knew nothing in those days of actual appendicitis; but he knew that the abdominal cavity was filled with pus and he applied the only sensible remedy and strange to say, the patient recovered.

The remarks of the great Hunter in the latter part of the last century on this subject might be taken almost in the light of prophecy, when we consider the following quotations from one of his lectures on surgery: "How far in such cases it might appear desirable to make an opening into the abdomen and throw in warm water repeatedly, to wash away the matter, I will not at present determine." This great man before the days of anaesthesia, before anything was known of bacteriology, saw with sufficient clearness into the possibilities of the future to make this suggestion.

If the life battle is waning and the life energies so rapidly fleeting as to make it unsafe to use general anaesthesia, I would under local anaesthesia in every case make one or more openings into the abdominal cavity in the most favorable locations and insure at least a partial escape of the hordes of enemies with which we know the peritoneum is waging this terrible struggle. In a small percentage of cases we will be rewarded by success and in proportion as those cases are early recognized and efficiently treated the percentage will increase.

Some ten years ago I was consulted by a young woman twenty-three years of age of strong physique and apparent good health. She saw me on Wednesday, complaining of what seemed a simple intestinal indigestion. Examination of the abdomen revealed absolutely nothing abnormal. I prescribed some simple intestinal astringent and advised her that she would probably be well in a day or two. The following Saturday, I being absent from the city, my partner was called and found that since the date of my visit on Wednesday there had been no movement of the bowels. He prescribed a calomel purge. This prescription was taken about nine o'clock in the evening. At two in the morning she was in collapse and died before daylight. A post mortem was refused, but a judicious incision made for the purpose of aiding the embalmer in preserving the body, disclosed a huge abscess cavity in the right iliac fossa and through the incision made at the crural arch escaped a large quantity of pus and a gangrenous appendix.

There was absolutely nothing in this case to suggest so grave a condition and such an one will have to be recorded as, fortunately a rare exception and one occasionally, but not often encountered. I do not agree with those who say that the pulse and temperature have little significance. In cases of this character I think both have a great deal of significance. Not in all, but in the majority of the fulminating cases, there is a suggestion of malignancy in the aspect of the case from the beginning. The attack is clean cut and incisive; a chill is often preliminary, followed by a temperature of 101 degrees, 102 degrees, or 103 degrees and a corresponding exaltation in pulse rate.

The right-sided pain, tenderness, rigidity are present usually in the exaggerated form up to the time when perforation has taken place when immediately follows apparent improvement and the symptoms all assume a favorable aspect and when the uninitiated physician and the hopeful sufferer both believe that the danger point is past, when in reality it has just been reached, the damage has been wrought and death's is the almost invariable result.

I will not burden you by transcribing from the proceedings of our Association of last year from the able and comprehensive article contributed upon this subject by Dr. Jelks, but I cannot refrain from transcribing the last two lines of that paper ascribed to Dr. W. W. Keen, of Philadelphia, who uttered them in a discussion upon this subject at the Denver meeting of the American Medical Association: "If the patient is no worse after forty-eight hours of observation let him alone; let him get well." I believe such advice is sound; but I would go further and say that if such an attack were the second or third, as soon as he had recovered I would urge with every argument in my power that he go to the operating room and have his appendix removed.

The general concensus of opinion among all surgeons, not only those belonging to the aggressive, but those also of the conservative school, is that in these fulminating cases, an early operation is the only hope of relief. If this be true how neces-

sary is it that every physician be educated as far as may be to the same view, in order that we may bring these sufferers to the operating table before the chances of surgical relief are reduced to a minimum.

The cases of fulminating appendicitis, when considering the subject of appendiceal inflammation from a statistical standpoint in attempting to establish the relative degrees of mortality, should occupy (to my mind) a special position entirely independent from the general list of cases.

To compare a simple catarrhal inflammation of the appendix with a malignant mixed infection, which is the usual cause of the fulminating form, would be like comparing a simple influenza with a double pneumonia, or a sprained ankle with a crushed leg. They are just as different in their clinical expressions and results. The one will get well under the simplest medical treatment and the other will eventuate in total destruction without competent surgical interference. If our medical confreres can be brought to realize that appendicitis in any of its forms, the majority of which may be considered by them not proper for surgical interference, is associated with so many uncertainties that only he who has had the widest experience in the handling of such, is capable of giving the best advice, they would materially lessen the mortality of these diseases, as well as lessen the criticism, much of which is unjust, which comes to us because of the supposed indiscriminate use of the knife in all cases.

I have gone over my private records of cases of this character for the past few months and find some twenty cases of fulminating appendicitis which were operated upon and gave a mortality of about fifty per cent. I feel sure that every case herein referred to had a period in its development, when if seen and carefully studied by a competent surgeon would have received proper treatment and that the mortality would have been cut down twenty-five per cent. In these twenty cases the greatest age was forty-four, the youngest two years. In one case there had been three previous attacks, in five cases there had been one previous attack. In one case the duration of

the attack was nineteen hours. This particular case was in the person of an officer of the regular army stationed at Fort Snelling, Minnesota. He had the good fortune to have for his professional attendants two of the most capable officers of the army, Dr. Borden and Dr. Shaw. He was a man considerably over two hundred pounds in weight, took his anaesthetic badly, the operation was done at midnight by artificial light in an improvised operating room in his quarters at the Post. The appendix was gangrenous although perforation had not actually taken place, the belly contained a quantity of turbid serum which was offensive.

With the recovery from his anaesthesia his temperature had materially fallen and in a few hours his convalescence was assured. Such a case treated with opium or treated medically would have undoubtedly resulted in death within twenty-four hours.

Of the other cases the longest duration was four days. In that case there had been no previous attack, and while the appendix was gangrenous, peritonitis was apparently localized and this case recovered.

Four days was the longest and nineteen hours the shortest period from the inception of the attack to the time of operative interference. The list comprises twenty-one cases, twelve of whom recovered and nine died.

In these explosive cases in the vast majority of those that I have encountered, the temperature and pulse are most significant. As before stated there is "an indescribable something" in the very aspect of the case which stamps it as malignant.

Of course, if it has gone sufficiently long to have the evidences of shock imprinted upon the surface, the gravity of the case would then be apparent to the most casual observer.

To refer again to the quotation of Dr. Keen; "wait forty-eight hours and if the patient is no worse, let him get well," in the majority of cases this advice could be safely followed provided the subject is under the observation of one qualified to correctly interpret the clinical picture.

When I am the attendant upon such a case I feel it incumbent upon me to watch it from hour to hour with the same vigilance that I would a case of prospective accouchement in which I knew the preceding labor had been associated with some dire complication.

If situated, as many of our professional brethren are, in the country where their patients are remote and can only be seen at long intervals, obviously the safest and most conservative treatment would be to operate at once, knowing that the mortality rate of operations made early in such cases is much less than where left to themselves.

There is a symptom in connection with peritonitis which I have noticed in nearly all of these cases. I have never seen it referred to in text books, nor mentioned by anybody else and when it is present it has always proven an unfailing sign of general abdominal suppuration. It is an apparent vaso-motor paralysis, which brings about a cyanosis of the trunk, notably of the abdominal region. It is of course, only one of the expressions of a condition of shock which follows perforation and a general abdominal infection. In my experience it is present in varying degrees in all cases. If in a given instance the patient is allowed to go to his death it precedes the grand finale but a few hours. It deepens until it becomes general and we have the general cyanosis of rapidly deepening color, the leaky skin, the incoherence of faulty cerebration and a speedy and merciful release from the suffering. In proportion as this cyanosis is pronounced or indistinct I have felt that I could express with reasonable assurance the probable malignancy of the infection. Any acute attack of pain in the right iliac fossa, in the so-called McBurney region, associated with rigidity of the abdominal muscles attended either with or without chill and a temperature of 102 degrees and a pulse of 100 or more should be watched constantly and with the most anxious solicitude and if these symptoms increase in severity as the hours go by, every hour of delay in the application of the knife is, in my judgment, a cruel injustice to the sufferer.

In conclusion I would reiterate that every case of appendicitis is and by right ought to be considered surgical, because the surgeon's training specially qualifies him to best interpret the meaning of the symptoms encountered.

Every case of so-called "fulminating appendicitis" should be operated upon as soon as its distinctive characteristics are known. High temperature and high pulse associated with local pain and rigidity are strong presumptive evidences of malignancy in the attack, and if associated with the vasomotor disturbances before referred to, are practically proof positive of the condition of perforation.

I believe that the surgeon who refuses the only chance that drainage may give even the most desperate cases, is false to himself and fails materially in discharging his obligations to his patient, obligations which his patient has a right to expect at his hands. A puncture in the median line, in the loins, or in a woman in the posterior cul-de-sac, under local anaesthesia, would not add to the danger of the condition and would materially aid nature in this awful uphill fight. In short, in every fulminating case operate first and philosophize afterward.

ORATION IN MEDICINE.—NUTRITION AND STIMULATION.

BY I. N. LOVE, M. D.

NEW YORK.

Mr. President and Gentlemen:

We are now fortunately in the "Scientific Age" of medicine.

There has been a wave of enthusiasm affecting the profession for the past three decades which has been growing stronger each year and is now truly at its flood, and this wave has concerned itself chiefly with what has been termed scientific research.

We are all now ready to announce our belief that the laboratory side of medical science must be cultivated as a foundation for the whole superstructure of more or less empirical clinical facts and we have given evidence by the establishment of numerous institutions for study along these lines and more will follow. More systematic and accurate methods are being applied throughout the entire field of medical practice than ever before and every worker, whether wielding the microscope, manipulating cultures or making clinical observations and studying bedside symptoms, realizes the importance of thoroughness and the application of careful scientific methods.

In passing it may be well to suggest that the term "scientific" has been used in too narrow a sense by many members of our guild. A recent writer very tersely says:

"The use of the word 'scientific' in a narrow sense as applied to laboratory work, has done much to arouse prejudice and establish false standards. By degrees there has grown up a distinction, which is now heard on every hand, between what is termed "scientific medicine," and "practical medicine," naturally with the implication that practical medicine as personified in the practitioner is not scientific. In other words 'scientific' as popularly used in medical writing and discourse

demands a laboratory and the accessories which a laboratory implies, whereas the man who is examining his patients from day to day in most painstaking and accurate fashion is looked upon perhaps as a faithful and conscientious practitioner, but not as a scientific investigator. So deeply has the laboratory impressed itself upon the uncritical thought of the time, that he who often aimlessly looks through a microscope, or with narrow vision describes a lesion, is placed upon a pedestal as a man of 'scientific' tendencies, while his colleague who faithfully describes a symptom is denied any such distinction.

"The reason for this anomalous state of affairs is certainly not far to seek. It lies in the fact that accuracy and hence knowledge have, in great measure, come by way of the laboratory. The insistence on the necessity of exact observation and description has certainly not had its origin with any one set of investigators in the general field of medicine. The laboratory worker deals with problems of the most complex sort, and on the other hand with facts which may be easily and accurately described. His claim to distinction as a scientific man does not, however, lie in his description of isolated facts, but wholly upon his attitude toward the problems, the solution of which depends upon the proper interpretation of those facts. Certainly nothing is simpler than to go into a laboratory and to describe at any length what one sees under a microscope. This is, however, not science, however often the results may masquerade as such, nor does the mere accomplishment of such work constitute a scientific man. But to go into a laboratory, to study facts laboriously, and then to appreciate clearly the meaning of those facts for the sum total of knowledge and to make generalizations therefrom is, properly speaking, 'scientific.' "

We are safe in saying that all which is "concerned with the acquisition of accurate and systematic knowledge of principles by observation and deduction is scientific. We must realize that a cell, as seen under a miscroscope, is no more an object of scientific investigation than a cough and a chill"; and we must be imbued with the thought that the science of

the sickroom, the science of life, its continuance, the securement of growth, the science of nutrition by which growth is accomplished, the securement and maintenance of a strong, robust, healthful physical and mental makeup and a useful, graceful old age, are all quite as important and worthy of our religious regard as laboratorical results and deadhouse details.

* * *

Continuance of life commencing with the original protoplasm, the cell, depends upon proper nourishment and a proper recognition of this fact and attention to the means of securing this result is the duty of the physician. In other words the physician should be interested in the child from and even before its conception.

May we not hope that the time will soon come when the physician will be the family counselor and not alone be called to see individual members of the family when sick, but advised with prior to any important domestic movement, especially in advance of all matrimonial plans.

A reckless disregard of the physical equipment of either one or both parties in a matrimonial partnership can only result sorrowfully.

"A child born weakly—of weakly parents, may be—perhaps weds precociously a weakly wife or husband, 'produces weakly children, and they weaklier children still,' of whom it may be emphatically said, 'better they had not been born,' 'for life is not to live, but to be well.' Without being actually ill, however, they are ever ailing, never healthy, never strong, sturdy, and active, as are many others; appetite is capricious, seldom good; food not taken with relish, hunger a sensation unknown to them; the poor, puny, pining things may be said to vegetate from day to day, instead of thrive and enjoy life; the pleasures of childhood are not theirs. 'A hale cobbler is a better man than an ailing king,' tersely and truly wrote somebody, for 'life consisteth not in the abundance that a man possesseth,' and compared with a good constitution, all the wealth of all the world is as nothing; yet how

marvelously little do some, in their thirst for riches or position, 'appear to think of this, when sanctioning or encouraging ill-assorted or non-assorted marriages, regardless of physical and mental fitness, and that common sense should tell them can only result in disaster.' Were parents careful as to the companionships their children form, instead of anxious for them to ally with those of every wealthy *roue,* who bear about them the too manifest constitutional deterioration it is desirable to avoid, we should be less often shocked by the pitiable objects we sometimes encounter."

If the physician could have a voice in the decision of these matrimonial schemes it would surely be well, but whether he has or not he surely should be constantly on duty after marriage as the adviser and helper in the securement of a healthful and well endowed heir.

We should insist that married life is a failure unless a child be born within a year. We should encourage the thought that barrenness is acknowledgement of physical or moral delinquency and in nearly every case is a reflection upon the party second, as well as the party of the first part.

* * *

Let us insist that the future man will be a more complete and perfect specimen if we as doctors can be permitted to feed him or direct his feeding from the moment that he is conceived and starts on his life's career. Every mother or prospective mother should be taught that she is from the time she reaches puberty, built and equipped for two, for herself and the child that from the beginning it was intended that she should bear and rear.

And so when bearing her child the mother should be taught every detail of personal hygiene, proper feeding and elimination not only for her own sake but for the health, life and perfection of the coming child.

Dr. Arthur W. Johnstone recently presented a most valuable paper (with the title "Auto-intoxication from Defective Menstruation") from the standpoint of nutrition, upon the utility of the function of menstruation as providing a means

of elimination for the surplus unused in child-bearing, demonstrating that many nervous symptoms of gynecologic subjects were due to retained excretions from defective menstruation, explaining many of the pathologic features of puberty and the menopause.

* * *

The chief real knowledge of proper infant feeding on the part of the medical profession is the development of the past twenty years. There was no real check upon the "slaughter of the innocents," the fearful, the awful infant mortality that obtained the world over until the problem of infant feeding was properly solved and the first step in its solution was the appreciation of the fact that the substitute food for the babe must be sterilized, and the second step was to know that sterilization means cleanliness rather than the destroying of micro-organisms in the food at the expense of killing the vital elements therein by cooking them to death, and the third step was the recognition of the fact that infantile intestinal disturbances were almost uniformly caused by improper food and the relief depended upon the correction of the food supply and the accomplishment of proper intestinal drainage—the removal from the bowels of the irritative materials.

The pioneer work of Pasteur, Tyndall, Lister and others was quite as important from a medical and dietetic standpoint as the surgical one.

* * *

It is needless for me to draw attention to the essential elements of proper food. We are all familiar with the three general groups of elements or necessary foods, which may be subdivided into (1) the mineral: water, salt, ashes of plants and animals; (2) the carbonaceous or respiratory, heat-giving, starch, sugar, fats, etc.; (3) the nitrogenous, flesh-forming, tissue-building, such as albumen, fibrin, casein, etc. It stands to reason that throughout life the mineral and respiratory foods are necessary in full amount but that when the individual has gained full maturity, complete growth, say after

the age of thirty, the nitrogenous or tissue-building foods are demanded in smaller quantity and after forty, the middle milepost of life, has been reached less than one-half or even one-third as much animal food is required as during the period of development.

This fact is not sufficiently appreciated and the continued use of large quantities of nitrogenous food after maturity accounts for numerous diseases.

The investigations and views of Haig, Garrod and others are being daily confirmed by careful observers as to the close relation existing between the excessive use of animal food and gouty as well as organic diseases in general.

Close study of numerous victims of the gouty diathesis, hereditary and acquired, has convinced most observers that the proper solution of the problems involved lies along the lines of judicious diet, which involves especially the reduction of animal food consumption and a more liberal use of fruits and vegetables.

When we realize how close the relation between gouty conditions, atheromatous degeneration, tuberculosis, cancer, general organic disease, premature age, and animal food in general we will surely study the question most assiduously.

The liberal eating of fruit is a most excellent habit to form; it not only opposes constipation and favors the freest elimination in a general way but the mineral salts contained in the fruit largely affect favorably the production of uric acid. The free eating of cherries, strawberries and grapes is an excellent fruit cure, and Weiss, acting upon the recommendation of Woehler and Linnæus, has recently made experiments which determine that quinic acid is probably the active ingredient which is present and which acts as a curative agent in gouty states.

A decoction of the root and leaves of the strawberry plant has long been a favorite domestic remedy in gout in some parts of Russia.

As a proper selection of the full varieties of food, their complete digestion and proper assimilation together with per-

fect elimination—in brief, a perfect scheme of metabolism—are all essential to growth, so they are demanded after full growth is accomplished in maintaining a healthful condition of the animal mechanism, but as previously stated, the essentials for keeping up the equilibrium of metabolism in the latter period are different.

The scheme of metabolism includes assimilation or tissue-building, the power which the animal organism possesses of accumulating from its food supplies a store of *potential* energy, which it is able to transform into *kinetic* energy, and which manifests itself commonly in the form of muscular work and the production of heat, and finally the formation and elimination of excretory products which result from the changes which occur in the constituents of the tissues as the necessary accompaniments of such transformation of energy.

The balancing of the bodily income and expenditures is the essence of health.

The real effect of food is to repair waste, administer to the growth of the bodily organs, maintain the balance of nutritive equilibrium under the varying conditions and circumstances to which the individual may be exposed, to maintain all the animal functions in complete activity and prevent loss of weight.

It is well that we exercise our intelligence in the selection of foods essential to health, to the proper running of our mechanisms, and remember that we eat to live and must not simply live to eat. In other words, after maturity there is grave danger to us in the cultivation of epicurean tastes, the love of the tickling of our palates.

It is not always safe to trust merely to the sensations of hunger, surely not to capricious choice or fanciful desires.

We cannot too strongly emphasize the thought that high livers are short livers. It is the part of wisdom for us, then, all to realize that as we approach maturity we must be satisfied to eat less and eliminate more and that the greatest helper in the flushing of the eliminating organs is large quantities of pure water, assisted now and then by liberal amounts

of Buffalo Lithia water, one of nature's best mineral waters.

Bodily exercise is absolutely essential to healthful activity of the eliminating organs, and unless we wish to be full, heavy, luggy and lazy as well as fair and fat at forty we must keep moving and echo loudly the words of Solomon, "Blessed be drudgery." As an exercise walking will ever continue to be healthful and good.

We as physicians fail in our duty when we do not announce in strongest terms not only the advantage from the standpoint of happiness, but also longevity, of plain living and high thinking.

During this last decade we have added more definitely to our knowledge of the keystone in the arch of metabolism, the glandular system, than ever before, and during this period we have secured our first real knowledge of those glandular organs which had previously been considered as almost superfluous, the ductless glands, such as the thyroid and thymus glands. It would be most interesting to review the bearing of these glands on growth and health, both mental and physical, but time will not permit.

* * *

As we have studied food problems, we have had crowded upon us more and more every day the necessity of state legislation in the matter of pure food laws. Correspondence during the past year with many thousand physicians elicited almost uniformly the view that legislation cannot be too strict which will favor purity of food laws. The medical profession of Missouri almost to a man has endorsed the legislation which precludes the sale of baking powders containing alum, an astringent which is certainly not favorable to good digestion, and other more comprehensive laws should follow. An investigation of the whole field of food adulteration presents facts which are almost appalling.

* * *

Some writers have placed under the head of medicinal or auxiliary foods those things which go to make up stimulants, neurotics and narcotics, such as alcohol, tea, coffee, tobacco, etc., but the expression auxiliary food is of doubtful propriety.

The term food should surely be applied only to those things

which are necessary to life. Among the so-called auxiliary foods alcohol is the only one which is open for discussion. Accepting as we may the views of Dujardin Beaumetz, Thompson, Pavy, Burney Yeo, Atwater and others in favor of the fact that when alcohol is ingested in the system in moderate quantities a part is utilized and only a part eliminated and it is therefore a food, it does not follow that it is essential to life.

Many things may be oxidized and used up in the body and be a food to that degree and yet not be a desirable food. The evidence is constantly accumulating that as a food alcohol is of doubtful utility, and the list of valuable foods that are in no way involved in doubt and certainly not harmful and dangerous to body, mind and soul is so great that alcohol as a food may well be left out of our nutritive philosophy and be permitted to take its place as a stimulant pure and simple.

As a matter of fact the, dangers that are associated with alcohol are so great that it should only be classed under the head of medicines and luxuries.

As a luxury alcohol certainly adds to the sum of human conviviality, cheerfulness and happiness when used in very moderate quantities, but then only with the meal. If used liberally it takes its place along with opium and Indian hemp as an exhilarant primarily and a depressant and narcotic secondarily.

A very limited amount of alcohol with the meal now and then does to advantage stimulate appetite and improve digestion and by its psychical effect making the user enjoy his food and environment, it may be helpful.

The limited amount of good that it may do in this way in a few rare cases is offset a thousand fold, yes a million fold, by the awful dangers which accompany its use. The writer of this address has had for years liberal views on this question, and while he believes that the proper solution of the temperance question lies in teaching every child from the beginning until matured, to be the ruler of its own spirit, to cultivate self-denial, self-control, self-respect, yet more and more as

time passes he believes that absolute avoidance of alcohol in all its forms as a beverage, as a luxury, is the safest course for all, and that while now and then a strong, self-reliant, rigid back-boned individual may with impunity take his occasional drink or liberal indulgence, the indorsement given to alcoholic drinking by his act, and the injury to his brother, whose keeper he surely is, however much he might wish to avoid his responsibility, is an unanswerable argument against him.

No one better than a physician knows the awful results to humanity, physical, mental and moral, of alcoholic indulgence. So that while being gently tolerant of the views of those not agreeing with me I am strong in the conviction, after many years of study of the subject, viewed from the standpoint of experience and observation, that as a luxury alcohol should be ruled out of our lives.

While holding this view I but regret that many opponents of alcohol are so severe, intemperate and almost unkind in their discussion of the question. Is it not better for us all to make our appeal in a kindlier spirit of charity to the judgment and intelligence of all concerned, presenting the argument that alcoholic indulgence is an injury to ourselves—a weakness and not a crime.

Alcohol as a medicine, a prompt and diffusible stimulant, has great value, but as each half decade of my experience has passed and I have taken stock of my knowledge I have been stronger in the view that in the majority of cases it can be dispensed with.

In advanced stages of typhoid fever, pneumonia, tuberculosis and sepsis it certainly meets conditions admirably, and yet in many of these we can substitute hot milk, coffee, tea, strychnia, normal salt solution and other remedies to excellent advantage.

Alcohol has been more abused, more excessively and needlessly used, more misapplied, than any other one remedy. The London *Lancet* recently quotes from the New York *Medical Journal* for Aug. 19, 1900, a case reported by Dr. M. A.

Walker of a boy of six years who before breakfast, about 8:30, drank without the knowledge of his parents three ounces of whisky. The parents knew nothing of the escapade until about 9:30, when the boy while sitting at the breakfast table first dropped a plate and then fell from his chair. At 10:15 he fell asleep on the floor, and his mother put him to bed thinking he would "sleep it off." There was no thought of serious consequences until 7:30 p. m., when the parents could not rouse him. At 7:45 he was comatose, the pupils were widely dilated and did not respond to light. The pulse was 145, small, weak, and compressible; the respirations were 40, easy, and quiet. The axillary temperature was 103.2 degrees. In spite of treatment (which is not described) circulation and respiration slowly failed. At 10:30 severe clonic convulsions occurred which lasted about ten minutes, and from this time there were almost constantly recurring localized spasms of the muscles of the face and extremities, the left side being much more affected than the right. Cheyne-Stokes respiration began about 2:45 a. m., and death from cardiac failure occurred at 5 a. m. No means of stimulation seemed to have the slightest effect on the heart. The rectal temperature rose to 105.3 degrees just before death.

What physician that closely scans the details in this case does not recall the victims of typhoid fever, pneumonia and diphtheria in the years gone by who were similarly symptomed from alcoholic drenching?

Let me urge you one and all in all the coming years have a care in the administration of alcohol—it is as dangerous as a drug as it is as a food.

Duty demands that the doctors utter a note of warning against the use of alcohol in any form by women.

Drinking on the part of women, whatever it may be abroad, is on the increase in America, particularly among the wealthy, the leisure class.

The modern woman is not as busy in a domestic way as she once was.

In many of the leading cities of America the free drinking of wine by very respectable women in public places is too

conspicuous, and they now liberally indulge in the luxury of the cocktail and the high ball, and overwhelming evidence can be presented that the soda fountain is a popular rendezvous for fashionable female tipplers in some of our leading cities. This is an awful thing. It is bad enough for men to drink but for women it is physical, mental and moral suicide. Their emotional make-up is such as to render the drinking of alcohol in any form deadly dangerous. At this point it cannot be too strongly stated that a physician should only in the direst extremity administer alcohol to a woman, to a nursing mother never. Too often beer or some sloppy malt extract masquerading in its place is given to the nursing mother to increase her flow of milk. It should be done—never.

* * *

Coffee, tea, cocoa and chocolate are all popular aromatic beverages which while differing considerably from one another in their common physical characters all agree in containing alkaloids closely resembling each other. Coffee and tea contain active principles caffein and theine, practically identical, and the others contain an alkaloid of theobromine, which is very like them. Coffee is the more powerful and on account of having much less tannin than tea is not so constipating. Tea being less potent is a safer beverage if used liberally. Chocolate as prepared from the cocoa of commerce is very weak in the alkaloid theobromine and being very rich in cocoa butter, made with milk as it usually is, makes a most nutritious drink.

Coffee properly made is a great comforter to mankind if not used to excess. It is truly "the cup that cheers but does not inebriate." It is a decided stimulant to the nervous system. Used intelligently it is a great conservator of energy, lessening the need for sleep after exertion, and removing the "tired feeling," and the best authorities claim that it has the power of augmenting the functional activity of the muscles, and a very stimulating effect upon the heart, in small quantities quickening its action, in large quantities slowing it, and in excess it seriously disturbs its rhythm and regu-

larity. If the digestion is above par, tea and coffee may be taken with meals but if impaired they should be taken pure without cream or sugar an hour or two before meals. Coffee increases the secretion of the skin and the kidneys and in the majority of cases it increases the flow of bile, peristalsis, and thus antagonizes constipation. This is the more apt to result if it be taken as a pure infusion an hour or two before meals in an empty stomach.

Tea and coffee, being stimulants, should not be given to children, on the principle that thoroughbred, spirited colts need no whip but oats instead.

Unquestionably the milder stimulants given to children during the growing period favor the appetite for stronger ones later.

It is well to remember that one good strong cup of coffee twice a day is ample for the average adult and if taken in this way if any exceptional demands be made upon one's strength or endurance the additional cup of coffee will assist in the meeting of the emergency admirably. In the sick room or for the victim of surgical shock a good strong infusion of coffee either by the mouth or the rectum is in the majority of cases superior to alcohol.

* * *

Tobacco is a luxury which may very properly be classed, save in its dangerous features, with coffee and tea, but like them both, it increases the power of resistance of the individual to fatigue and enables him to meet great tests of endurance and indulge in prolonged abstinence from food.

Tobacco differs from alcohol in every essential; the latter, whether we accept the idea that it is a food or not a food, can only be pronounced poisonous or dangerous so far as the individual dose is concerned when given in very large quantity, whereas tobacco in itself contains (no matter how small the portion) an active poison, a narcotic, which readily affects the brain. The secondary effects of all stimulants like alcohol and sedatives like tea and coffee are narcotic, but some like tobacco, opium, henbane, etc., seem to attack immediately the centers of the brain.

The tobacco plant belongs to the genus *Nicotiana,* a name given to it in honor of Jean Nicot, a French ambassador at the court of Portugal, who first introduced this plant into France.

Belonging to this genus are several species, which yield at the present day the tobacco of commerce.

These plants belong to the natural order *Solanacae,* a family which yields us not only tobacco but stramonium (Jamestown weed), belladonna (or deadly nightshade), henbane, cayenne pepper, tomatoes, ground cherries, potatoes and mandrakes.

A well-known writer has observed: "At first sight this looks like an incongruous family, but still there are certain common properties running through the whole order. All contain, more or less, substances that act on the nervous system, and thus increase from the mild poison of the solanums till we arrive at the deadly principles of the atropas, the henbanes and the tobaccos. It seems well established that smoking was introduced from the *new* into the *old* world, yet in the latter there was ample material for its indulgence, for at least two species of *Nicotiana,* the *N. Rustica* and *N. Persica,* are indigenous to Asia. The American plant, the *Nicotiana Tabacum,* has been the one most cultivated and Virginia, Kentucky, Maryland and Ohio are the states where it has been cultivated to the best advantage. Canada has produced some fairly good tobacco, South America sends tobacco to Europe in large quantities, but for long the best tobacco in the world has come from Cuba. Our new possession, Manila, has furnished a high-grade specimen of great fame. From Persia has been brought the refined and delicate 'Shiraz tobacco' procured from *Nicotiana Persica,* but the most aristocratic variety, *Latakia,* is produced in Turkey by the *Nicotiana rustica.* In Africa and Egypt the American species thrive. Algeria furnishes the chief supply of tobacco to France and this explains the zeal of custom house officers at French ports in confiscating promptly the personal supply of cigars in the belongings of American globe trotters. Germany, Holland and other European countries furnish a proportion of low-grade specimens.

Tobacco is used in three different ways, either chewed, smoked or in the form of snuff through the nasal passages.

It would be interesting to discuss the details of the manufacture of tobacco, its proper treatment before being ready for chewing, smoking or snuffing, but time will not permit. In each case the effect is the same and the result depends upon the absorption of the active principle, nicotine, and whether one snuffs, chews or smokes, unless he be possessed of a strong will power he becomes more and more a slave to a narcotic but a step removed from those which are more alluring, such as opium, morphine and cocaine.

In order to fully understand the effect of tobacco it is well to consider its constituent parts. In the analysis of a pound of tobacco, the fresh dried leaves, we have:

	Ounces.	Grains.
Nicotine	0	419
Concrete volatile oil	0	7
Chlorophyl	1	46
Gum	1	222
Starch	0	279
Albumen and gluten	0	349
Sugar	0	139
Salts	2	245
Water	1	402

In chewing tobacco about the only constituents which can exercise much influence upon the system are the nicotine and volatile oil. Of course the soluble salts would act the same as the saline constituents of other plants and they explain why tobacco is such an exhausting crop for the soil.

Among the salts of tobacco the nitrates are most abundant and this explains the ready way in which tobacco burns in the process of its smoking. In snuffing the soluble parts of the tobacco, as in chewing, are after being dissolved absorbed through the mucous membrane. In these latter days we understand that the intense vascularity of the nasal mucous membrane permits rapid absorption and the nicotine readily enters the circulation the same as we have demonstrated that solutions of morphine do and as thoughtless rhinologists have

shown in their temporizing and palliative treatment of nasal catarrh and hay fever by means of the cocaine spray.

In considering the chewing of tobacco from a medical standpoint we have to consider the nicotine absorbed through the buccal and pharyngeal mucous membranes and the small amount probably swallowed, together with the draught upon the salivary glands and the waste of saliva.

Of course the chewing of tobacco, viewed from a polite standpoint, unless absolutely in private, cannot be considered other than in bad form. In the animal economy we have the secretory and excretory system of glands; the products, of the former are essential to the proper performance of physiological duty within the body and must be husbanded, and the latter are no longer needed and naturally seek the external world, but their proper disposal should be in private, away from the haunts of men, surely not in a way to offend the feelings of others or to make of one's self a public nuisance..

So of course tobacco-spitting cannot be excused under any circumstances from the polite standpoint, but the saliva is a secretion, not an excretion, and its free expectoration is a needless waste.

The use of tobacco by smoking is becoming more and more the almost exclusive way, and while in the earlier days the pipe was much in evidence the cigar has almost crowded it out. It is interesting to study the history and preparation of tobacco and the manner of making cigars, but the main thing for us to recall is that while a good cigar used very temperately two or three times a day may be smoked by the average adult man to good advantage, too excessive indulgence in smoking is very harmful.

It is only necessary to recall one's first cigar and the profound effect it produced to realize that the smoking of tobacco in large quantities is trifling with a dangerous agent.

In tobacco smoke we have the following: Nicotine, empyreumatic oil, butyric acid, carbonic acid, ammonia, paraffine, empyreumatic resin, acetic acid, carbonic oxide, carburetted hydrogen and water.

The chief effects of smoking are from the nicotine and empyreumatic oil, the first being an active poison and an infinitesimal quantity will destroy life, and the latter, which is the rank accumulation in the stem of the pipe, is also a potent poison, one drop on the tongue of a cat having been fatal. The nicotine and the oil both act on the nervous system, though differently, the nicotine paralyzing the heart by its action on the brain, while the oil confines itself chiefly to the spinal cord and the motor nerves. It will thus be seen that no part of the victim's equipment escapes the deadly effect of tobacco in excess; as Lankester observes, "the nicotine seizes on the main citadel and the distilled oil attacks the outposts, and the whole man—body and mind—is brought under their influence."

In smoking, the air passages soon become congested, hypersensitive and susceptible to infectious germs. A smoker's throat is a standing invitation to infections of the air passages. I have been studying the effects of tobacco for many years, keeping a record of its victims who have come under my care, and my casebook, carefully analyzed, justifies me in concluding that—

1. Smoking in excess is more harmful than chewing, for the reason that the nervous system is not only more injuriously affected, but the catarrhal disturbances of the air passages render the smoker more liable to dangerous and fatal diseases of the air passages.

2. The excessive smoker is not only more liable to pneumonia, grip, tuberculosis, laryngeal and pulmonary, as the sensitive mucous surfaces and the bankrupted nervous system present a double invitation at all times, but fatal results are more apt to occur. Every case of laryngeal tuberculosis coming under my observation for several years has presented a history of being a smoker, in the majority of cases to excess.

3. Heart failure is a frequent complication in serious disease with excessive smokers.

4. Cigarette smoking is worse than either the cigar or the pipe, but only for the reason that the cigarette being a milder

tobacco the smoker almost universally inhales the tobacco fumes, and when we realize the component parts of tobacco smoke and how direct the route from the air vesicles of the lungs into the blood current we can appreciate the ill effects.

5. Inveighing against the cigarette on the ground that the paper is poisonous and the tobacco drugged, mixed with Indian hemp, etc., is all wrong, as the cigarette, being a milder tobacco, perfectly pure, and the paper unobjectionable, if smoked without inhaling and in a temperate way, is to be preferred.

6. The cigarette smoker nearly always inhales the smoke and being habituated to this quick toxic action he will not smoke without inhaling whether he use the cigarette, the cigar or the pipe, for the same reason that the morphine habitue accustomed to the hypodermic method will not be satisfied with the drug through the mouth; both victims want quick action.

7. Children who use tobacco before reaching maturity have their growth interrupted, as nothing more definitely interferes with the equilibrium of tissue-building, digestion, assimilation, elimination, metabolism, than tobacco, and for these reasons its use favors gouty diseases, atheromatous degeneration, premature senility and decay. The excessive users of tobacco are crippled in their general equipment and in no form to wrestle successfully with any disease.

8. He who smokes cigarettes to excess or uses tobacco in any form to excess is in danger of becoming an alcoholic, but in even greater danger of becoming a drugger, as tobacco is closely allied to opium and Indian hemp.

In a general way one excess invites another, as the will power becomes lessened.

9. Nothing is so apt to bankrupt the sexual equipment as tobacco unless it be opium, as it stands to reason that a cerebrospinal paralyzant must obtund sexual desire and power.

10. The numerous mental wrecks, youths who have come under my care during the past ten years, whose lives were failures, or who fill suicides' graves, impress me that today tobacco stands as the gravest danger confronting the new cen-

tury, and the medical profession has a fearful responsibility in educating young men and their parents to appreciate this danger.

The business world is, I am glad to see, undertaking the solution of the tobacco problem the same as it has that of alcohol, in that it is declining to employ cigarette fiends as well as those who drink moderately or to excess.

I am firm in the view that the medical profession must study calmly, tolerantly, temperately, the problems related to stimulants of all kinds, but tobacco and alcohol in particular, and they put themselves in best form for doing the best work along these lines and wielding their greatest influence for good by themselves being exemplars of temperance, self-restraint, self-denial and correct living.

SPECIAL ARTICLE.

RECENT ADVANCES IN THE MEDICAL ARTS.*

EDITED BY S. F. BROTHERS, M. D.,

NEW YORK, N. Y.

It is a very difficult problem, that of obtaining absolutely reliable information regarding the *accepted* advances in the medical arts. We cannot rely on our own judgment, because that only represents individual impressions; we cannot depend on the judgment of medical societies, because these never represent very largely the individual feelings of its members; we cannot rely even on the works of accepted authorities, because these do not represent the results of extended personal association with patients. Only one method, then, seems reliable, if possible of attainment, that of the formation of a World Medical Congress, which shall appoint delegates to act for every known local collection of practicing physicians (whether specialists or general practitioners), these delegates to obtain the individual written opinions of each and every one annually.

GYNECOLOGICAL.—The modern treatment of *chronic endometritis* may be briefly summarized under the following heads: (1) Removal of cause, *e. g.*, uterine displacements, perineal lacerations, etc.; (2) perseverant use of hot douches, with the patient in the dorsal position, practiced at least twice daily for weeks or months; (3) curettage; (4) intra-uterine applications, iodin, ichthyol, carbolic acid, etc.; (5) tamponade, which is now deservedly being abandoned by the profession.

Occasional difficulty of establishing the *diagnosis* between chronic *endometritis* and *cancer* of the body of the uterus. The great importance of making a positive diagnosis need hardly be emphasized:

1. Metrorrhagia, always present and occasionally profuse in cancer, whereas in endometritis it may be absent, and is rarely large in amount.

2. Offensiveness of the discharge is found at an earlier period in endometritis than in cancer; the discharge, moreover,

*Liberal abstracts from A. E. Giles, M. D., and others, from "Treat's Annual," 1900.

is less purulent and more serous in cancer than in endometritis.

3. Pain may be quite absent, and is rarely intense in endometritis; in cancer, on the other hand, it is almost always present, except in the very early stages.

4. Cachexia is the same in the two cases, but in endometritis it soon ameliorates as the result of treatment, whereas in cancer it becomes progressively worse.

Gastro-intestinal hemorrhage in the newborn has been treated with a solution of gelatin, both by mouth and by the rectum, and the hypodermic use of morphine has been found more beneficial than anything else.

In advocating the adoption of conservative principles in gynecological surgery, Martin (*British Medical Journal,* September, 1898) thus sums up the results of *removal of both ovaries:*

1. The woman becomes absolutely sterile.

2. Menstruation ceases in about 95 per cent. of the cases.

3. The generative organs atrophy.

4. Nervous symptoms of the menopause come on abruptly and violently, namely, heats and flushes, perspirations, palpitations, giddiness, depression of spirits, and a generally unstable condition of the nervous system.

5. In a considerable majority of cases there is a diminution or total abolition of the sexual instincts.

6. The patient has a tendency to obesity. If one ovary, or even a portion of one, be left behind, none of these symptoms appear.

Vaginismus and *hyperesthesia* of the *vulva* have been successfully treated by hypnotic suggestion. In *puerperal septicemia* Manseau says that continued irrigation should follow the curette. He adopts the plan first advocated by us five years ago, of using immense quantities of fluid (up to 2,000 gallons in sixteen days).

OBSTETRICAL.—*To expedite delivery or inevitable abortion,* force one finger through os, then two (index and middle), these being spread until cervix is thoroughly dilated. In *sudden or threatened death of mother,* Demelin dilates with fingers of two hands (as for rectal ulcer) when possible. For *contracted pel-*

vis Radojewski passes a uterine sound into the fetal after-coming spinal foramen, followed by an elastic catheter, through which he washes away the brain. Budberg (of the Dorpat clinic) advocates his treatment of the *stump of the umbilical cord;* he wraps it in a cotton soaked in pure alcohol. He claims that under this treatment suppuration does not occur, and the cord promptly separates. For *apparent death in the pallid stage,* stop violence, do not cut cord but deliver placenta, cleanse its maternal surface with warm water if necessary, and expose (spread out) to the atmosphere. Usual treatment to be adopted as well. Where *hemorrhage* occurs *before placenta is expelled,* a hot douche into the vagina or uterus may be tried. *After removal* of *placenta,* do not be afraid to remove all possible clots. For hemorrhage *from contracted uterus,* grasp fundus through abdomen with left palm, pass whole right hand into vagina with two extended fingers into the uterus, these being rubbed firmly over entire walls, especially posterior and upper; small shreds of tissue will be removed, and hemorrhage will cease; if not, iodoform gauze packing. In *hemorrhage anemia,* avoid quinine in large doses, even if temperature is present. Raise the lower extremities, also the upper, very high in the air to relieve the central circulation. *Puerperal eclampsia,* amount of urine passed constantly diminishing, induce labor, as soon as symptoms become pronounced, under chloroform. Dührssen advises prompt delivery by incising the cervix in four directions completely, and high forceps; outside of this the usual well-known procedures are to be followed.

We have been *delivering* women for years, centuries, ages, and yet today the obstetric process in "natural" labors is no further advanced than it was ages and ages ago. Are we to be complimented for this great progress (?)—hypnotizing women to repress their agonizing suffering for hours and hours? And even this "science" is as well known to the savage as to us. Let our charitable institutions inaugurate a system of immediate delivery, at least in normal cases, and sensible women will soon demand it in private practice; in fact, they cry for it now at every labor. The mortality will not and cannot be

higher, nay, *must* be lower than by "leaving it to nature." Let us, then, make a start. As soon as suffering sets in, let us place our patient on the operating-table; let us chloroform; let us dilate her cervix, vagina, and vulva artificially until our forceps can be applied and the high operation performed; let us remove the placenta, contract the uterus, control the hemorrhage, suture the lacerations, and then remove our chloroform after a painless surgical procedure, as delivery can be made! Even if the recourse to such a system succeed in driving the abusers of charity out of maternities, it would be an additional reason for its adoption.

The sacrifice of a mother's life, or even her whole future comfort, by *major operations* merely for the sake of possibly saving an unborn fetus, or for giving maternities more material, is losing more and more adherents. The *forceps* should not be abandoned in *difficult deliveries* until at least three physicians have failed to extract with them.

Obstinate eczema on the *breast* and other places is best treated by the application of 4 per cent. solution of cocaine hydrochlorate, and followed by a 6 per cent. nitrate of silver solution. It is generally admitted that *vaginal douches* (which should never be under two quarts, and as frequently repeated in serious cases as every hour) are as effective and not at all as subject to risk as uterine irrigations. The only exception to this rule is during pregnancy, when infrequent, small douches should be the rule, to be remitted on the appearance of the slightest objectionable symptom.

In *tedious second stage* patient may be allowed out of bed under proper precautions (hand on vulva). The routine suture of every *moderately lacerated perineum* is now generally abandoned, suturing being practiced at the birth only under favorable conditions; that is, when patient is not positively opposed to it, when physician is not exhausted, etc.

Max Madlener has had good results with sugar solution in cases of *insufficient labor pains*. He gives one ounce of sugar dissolved in eight ounces of water, repeating if necessary. If more acceptable to the palate, the draught may be flavored

with tea or rum. Nausea is never produced. In from half to one hour after administration the effect is manifest, the uterine contractions being greatly stimulated, while the physical pain is somewhat diminished.

Dr. Charles Greene Cumston, of Boston, advocates the treatment of *chronic cystitis* in the female of *tuberculous,* as well as of *non-tuberculous* origin, by curettage of the bladder and instillations of corrosive sublimate.

SURGICAL.—A restitution of the continuity of the tibia has been effected by *transplantation of the patella* into an extensive *osteomyelitic defect* by N. Senn.

Dr. L. Stimson gives a new method of reducing almost every variety of *hip and shoulder dislocations.* The method is an exceedingly simple one, and he claims that it has not failed yet in any of the cases on which he and some of his colleagues tried it. In the case of shoulder dislocations the patient is placed on a high cot bed, with the affected arm hanging down through a hole made for that purpose near the center of the bed; from his hand is suspended a weight of about ten pounds. No anesthesia is required; in about five minutes the dislocation is reduced. For dislocations of the hip the patient is placed, face downward, upon a hard table with the iliac spines resting near the edge; the sound limb is supported by an assistant in a horizontally extended position; the sound thigh is allowed to hang vertically downward, with the knee flexed to a right angle and the foot supported by the surgeon; a weight of about ten to fifteen pounds is placed in the popliteal space. In a few minutes the dislocation is reduced. A little manipulation, such as gently rocking the limb, etc., may be required.

G. S. Armstrong thus summarizes the appropriate treatment of *burns,* he having in the past two years treated 176 cases, chiefly of the second degree: Water, or solutions containing water, are bad; vaseline acts badly; the application of cotton lint, gauze, or any dressing with a rough surface is inexcusable: (1) Cut away with particular care every portion of every bleb, even the smallest. (2) Apply castor oil 95 per cent. and balsam of Peru 5 per cent., or lanolin. (3) Cover this

with gutta percha or oiled silk, perforated or not. (4) The molecular death and separation of tissues will cause an accumulation under the gutta percha, which must be removed each day by gentle mopping with absorbent cotton.

A contracting *scar of the palm* of the hand has been remedied by a flap from the abdomen.

W. Skinner, in summarizing the treatment of *traumatic neurosis* (*Journal of the American Medical Association*, September 22, 1900), says: Rest treatment is the best. Rigid isolation should be insisted upon. If this fails, there should be complete change of climate and scene. Hydrotherapy is of great utility. Drugs are of comparatively little value.

Contrary to former opinion, it is now conceded that a patient under *hypnotism* need not be totally unconscious to resist, incapable of performing some voluntary actions, carry out suggestions to the letter, or an unfit subject because the first seances failed; and need not be harmful in any way (Liebeault, Bernheim, Forel, Wetterstrand, Van Eeden, De Jong, and J. M. Bramwell).

Progress in *X-ray work* has been chiefly in the direction of improving the methods of interrupting the current, with the object of displacing the hammer-break of the ordinary induction coil; the devising of more portable apparatus, especially for use in military surgery in the field; and the application of the Winshurst machine for the excitation of X-ray tubes.

Lupus finds the most favorable results in sun rays and electric arc light rays.

Hirsutes (abnormal hair growth), X-rays have given results which promise to displace the electric needle.

Enlargement of the urethral meatus is now effected by "cutting from without, with a sharp-curved bistoury on a grooved director passed within the urethra." The exact length of the incision can in this way be readily controlled. Cocaine may be employed if desired.

Urethral Stricture. Some patients can only be properly treated by placing them in a hospital for a limited period, otherwise at the first severe pain or sight of blood they will stop

treatment, until the urine can no longer be passed and the stricture becomes so tight that the greatest difficulty is experienced in introducing even the finest filiform bougie.

Gleet. For *urethral ulcer* first apply a solution of cocaine by means of a properly-curved (if necessary) uterine probe with cotton, and then a solution of nitrate of silver.

It seems to be well established now that there is such a thing as *general gonorrheal peritonitis.* Cases are on record where microscopical examinations of the intraperitoneal fluid during a laparotomy showed the gonococci. The infection occurs through the fallopian tube. The existence of this form of peritonitis is probably more frequent than one would suppose; they cannot be distinguished from other forms of peritonitis, and many cases probably remain unrecognized.

Methylene blue administered internally seems to have a specific effect in *acute gonorrhea.* J. Moore (*British Medical Journal,* 1897) reports nine cases of acute gonorrhea in which methylene blue has been administered in doses of three grains three times a day. The discharge ceased in from twelve to sixteen days. A good prescription, which is now a favorite one with many physicians, is as follows:

R Methylene blue .....gr. xii;
Olei Santali,..... .....3i;
Salol,.....3i;
Acaciæ,.....q. s.
M. ft, caps. No. xii.

H. H. Morton gives the treatment of *acute seminal vesiculitis* as follows: Rest in bed, saline cathartic, hot sitz-baths, and copious irrigations of the rectum with hot water; if the posterior urethritis is severe, sandalwood oil relieves the tenesmus and renders the urine less irritating. Injections into the anterior urethra, of course, are contra-indicated, but above all things any attempt at massage or stripping the vesicles should be absolutely interdicted. Under this plan of treatment most cases of acute vesiculitis will recover in from two to four weeks.

For *seminal emissions* without marked erections:

R Strychninæ sulphatis,... .....gr. i;
Acidi phosphorici duluti,.....ʒ ii.
M. S. M xxv in water after meals.

B. K. TWITCHELL.

The treatment of *prostatic enlargement* by galvano-cautery incisions made by a special instrument introduced through the urethra, as advocated twenty-five years ago by Bottini, is now received with much favor. In the hands of a skilled surgeon it is the best treatment for that condition. The operation is performed with a local anesthetic.

A. C. Wood *(Annals of Surgery,* September, 1900) has gathered the records of a number of cases of vasectomy and of castration performed for the relief of *prostatic hypertrophy.* In the vasectomies 67 per cent. of the cases were followed by general improvement. His article is a very valuable contribution on the subject.

Leone Levi treats *initial lesions of syphilis* as follows: He cauterizes it, preferably by means of the galvano-cautery, as many times as necessary, until the treatment determines an intense local inflammation of the tissues. This makes of the syphilide a mere local infection, preventing constitutional infection with all its consequences. He describes his method in detail, and claims absolutely successful results in thirty-two cases (*La Riforma Medica,* July 19, 1900).

The operation of *lithotrity* is rapidly coming to the front rank. Its contra-indications are at present stated to be: (1) If the stone is too large or too hard; (2) if the bladder is sacculated; (3) if there is a severe accompanying cystitis; (4) if the urethra is too small. In these cases suprapubic lithotomy is usually performed, while the old lateral and median lithotomy is almost obsolete.

Drs. J. Marcus, Marx, Goffe, Ware, and others report favorably on "Corning's method" of medullary narcosis. An *intraspinous injection of cocaine* produces such anesthesia of the lower trunk and extremities that *even a laparotomy* may be painlessly performed.

MEDICAL. Ice-water gargling for *persistent hiccough* is employed with entire success.

For *whooping-cough,* inhalations of steam and internal administration of antipyrine with bromide of sodium is the most effective treatment.

Dr. Cerioli reports fifteen cases of whooping-cough treated *with diphtheria antitoxin;* the results were surprising; the cases were severe and complicated, and still improvement took place in a few hours.

Thyroid extract in *inoperable carcinoma* of the breast furnishes the following advantages: (1) The growth is less rapid; (2) there is a smaller tendency to cachexia; (3) the unpleasant odor disappears; (4) life is prolonged.

Thyroid extract has been also employed in myxedema, cretinism, psoriasis, and obesity. *Bone marrow* for pernicious and other forms of anemia; *antistreptococcic* serum for erysipelas and septicemia (given early and in large doses); *antitetanic serum* for tetanus (besides usual surgical procedures).

Suprarenal extract in dose of nine grains produced rapid improvement in a case of *Addison's disease.* In forty-three collected cases so treated there was improvement in thirteen, recovery in nine, death in eleven; no improvement in three, and in seven the result is not recorded (W. W. Johnston).

Diarrhea and dysentery in infants. Barley- or rice-water should be made exceedingly thin (one-half teaspoonful to a bottle), and when finished should be almost as thin as water and unspecked (to be strained through a cloth and not through a metal strainer).

The natives of South Africa make use of the root of geranium, of which there is said to be a number of varieties, all, however, of equal therapeutic efficacy in the treatment of *dysentery.* They simply chew the root, but the British army surgeons give it in the form of decoction in milk. The remedy is reported by those who have employed it to be a real specific, no failure to cure within thirty-six or forty-eight hours being recorded.

The treatment of *pulmonary tuberculosis* by intrapleural injections of nitrogen gas is being received with much favor by many authorities. Dr. H. P. Loomis (*New York Medical Record,* September 29, 1900) reports a number of cases in which he has tried this treatment, and draws the following conclusions: (*a*) I have never seen any bad results or even unpleasant effects. (*b*) I have seen no case result in absolute

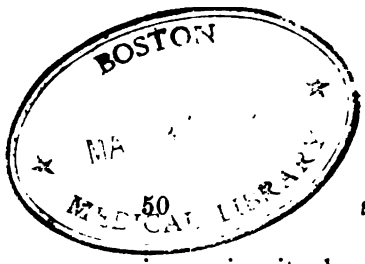
cure of the disease. (*c*) I have certainly seen the apparent arrest of the disease in two cases, and the disappearance of such constitutional symptoms as expectoration, fever, and cough in a number more. Sufficient time has not yet elapsed to say whether in the most favorable cases the activity of the disease may not return. (*d*) The local improvement is not so apparent as the constitutional. (*e*) A marked gain in weight is found in every case injected. This is so universal as to be astonishing especially as the cases have had no other treatment, and many of them have been in hospital wards and under anti-hygienic surroundings. (*f*) It has never failed to control hemoptysis, even in the most desperate cases. (*g*) In some cases it is impossible to introduce the gas on account of pleuritic adhesions.

For *hemorrhage from the lungs* the most effective treatment is tying a cord around three of the extremities so tightly as to cause the limb to swell; after the first limb has been bandaged thus for a short time it should be released and the fourth extremely bandaged, and this process should be repeated with each limb in turn. Usually it does not take any longer than two or three hours to control the hemorrhage.

Louis J. Lautenbach advises adding 1-100 grain of phosphorus and 1-12 grain of pure free iodine to each tablespoonful of *cod-liver oil.* The oil becomes less repulsive to taste and smell, more digestible, and less liable to be followed by eructations; its therapeutic value is thereby much increased. It is ordered to be taken on retiring, dose one tablespoonful, and followed by a taste of lemon. Its use has been followed by the most gratifying results.

For the *ascites of cirrhosis,* much better than purgatives and diuretics is early tapping of the abdomen under aseptic precautions. It gives relief to the patient and tends to prolong life.

It is beginning to be recognized that drugging for minor complaints, especially with *opiates* and *stimulants,* has the one great disadvantage of making a patient reckless because of the relief afforded. Thus a person with recurring "colds" resorts to his favorite prescription on the slightest provocation,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increasing its dose and frequency with each attack. At some time or other he develops a pneumonia from the failure to rest his body instead of continuing under the artificial stimulus, when he collapses all at once. Physicians themselves are frequently the victims of such abuses.

In the use of permanganate of potassium irrigations and "tongue respiration" for *morphine poisoning,* care should be taken to avoid such a degree of violence that a fatal *glossitis* should supervene.

Lanceraux treats *inoperable aneurisms* by repeated subcutaneous injections of gelatin, in addition to the ordinary constitutional treatment. He and Stoicesco report a number of cases which have been cured by this method.

The tremor of *paralysis agitans* is notably diminished by one or two injections daily of hydrobromate of hyoscine, 1-200 grain (Erb.)

"Quinine chocolates" are now administered in powder or in mixture, by rubbing up the tablets in a mortar.

Dr. Becker advocates strongly the use of *salicylic acid* for *lobar pneumonia.* He gives seven grains every two or three hours to adults, and one and one-half grains every hour to a child, coffee, chocolate, and milk being given after its administration. Cardiac disease and extreme weakness are contra-indications of this treatment.

Lithemia as an element in chronic nasal catarrh, calculi, anemia, neuralgia, tachycardia and other functional cardiac troubles, uterine disorders, tonsillitis, bronchitis and even pulmonary disease, as well as *pleurisy* and *peritonitis,* are now well recognized. Anti-rheumatic treatment is indicated.

External applications of *ichthyol* for *acute articular rheumatism.*

Deep injections of antipyrin into the muscles in the region of the sciatic nerve promptly relieves *sciatica.* Insert a long needle at a point nearly midway between the great trochanter and the tuber ischii, and a little below line joining these points. (Kuhm in *American Medical and Surgical Bulletin,* July 25, 1898.)

Glaucoma. The treatment of glaucoma by resection of the superior cervical ganglion was inaugurated by Jonnesco, Bucharest, September, 1897. Since that time he has operated successfully on eight more cases. Zimmerman, Stuttgart, reports one case, and Mohr three cases. The general results obtained were: (1) Decrease of intraocular tension; (2) contraction of pupil; (3) relief of periorbital pain; (4) cessation of the attacks in irritative glaucoma; (5) lasting increase in vision and visual field. The permanent effects are ptosis, narrowing, and paresis of the pupil, and sinking of the eyeball within the orbit.

Massage in Glaucoma. Gould, of Philadelphia, confirms the gratifying results obtained by Darier and others, and reports several cases, notably one, of six years' standing. The technique consists in alternate palpation through the upper lid as in determining the tension of the eyes. The movements are to be increased slowly and softly, and the release of pressure gradual. The massage is to be repeated in every possible position of the eyes. From two to five minutes is usually required to reduce the tension to the normal.

Cataract. As to the etiology of cataract, Jonas is of the opinion that it is a reflex affection having its origin in disease of the nares. Secondary cataract in the rabbit, Bates' experiments show, is due to the production of fibrin in the pupillary area from coagulable material introduced during operation and ending in connective tissue. It may be prevented by rapid operation, closure of corneal or scleral wound by sutures, and washing out and restoring anterior chamber with normal saline solution, as has been recommended by Knapp in cases of collapse of the anterior chamber in the human eye. It is probable that the same process occurs in man.

In operating for secondary membranous cataract where the pupil is undilatable, but not adherent, Harry D. Noyes, regards Pinto's method as most satisfactory, namely, to enter through the sclera behind the iris and make a free incision in the membrane. To prevent the escape of vitreous by gaping of the wound, Noyes has devised a modification of the Graefe knife,

having a narrow blade eight mm. in length on a very small round shank. His method is to enter the sclera three or four mm. from the limbus, pushing the knife from behind forward posterior to the iris until the point appears on the proximal side of the pupil. By a to-and-fro movement the membrane is cut in a vertical direction, the point of the knife emerging into the anterior chamber. Next passing to the distal side of the pupil another vertical section is made and the two united, forming the letter H. The point is now moved about in all directions until a perfectly black pupil is obtained. With proper antisepsis and delicacy in manipulation undue ciliary disturbance will rarely ensue.

In senile cataract Fergus objects to preliminary iridectomy for three reasons: (*a*) The eye is twice exposed to infection; (*b*) increase in astigmatism from double cicatrization; (*c*) unnecessary annoyance to patient.

After cataract extraction Wolffberg recommends the use of the new drug dionin to contract the vessels and increase the tone of the cornea. If there should be a rent in the conjunctiva, decided chemosis may result for a time, but the cornea remains clear and the vision is not impaired.

Operative Treatment of Myopia. Chas. Stedman Bull gives an interesting resumé of the removal of the lens for myopia and regards the indications for operation to be: (1) When central vision, with the best possible glass correction, is not sufficient for the needs or social position of the patient; (2) when there are positive signs of a rapid increase in the myopia; and (3) when the myopia is 12 D. or more. The contra-indications are: (1) Extensive retinal or choroidal changes in macular region; (2) detachment of the retina; (3) membranous opacities in the vitreous; (4) previous loss of one eye from any cause; (5) decided corneal opacity; (6) contagious conjunctivitis, especially trachoma; (7) old age; (8) myopia less than 12 D.

The dangers are (1) intraocular hemorrhage from retinal or choroidal vessels; (2) detachment of retina; (3) secondary glaucomatous symptoms from swelling of lens after lacera-

tion of the capsule, and (4) infection of corneal wound, iris, or both.

Evisceration versus Enucleation. Buller says that Mules' operation is preferable except in (*a*) intraocular and orbital malignant growths; (*b*) extensive or lacerated wounds of the sclera; (*c*) shrunken globe; (*d*) where sympathetic disease has already begun.

Huizinga proposes a new operation, eviscero-neurotomy. It consists in amputating the cornea, enlarging the opening laterally to the insertions of the recti muscles, and scraping out the contents of the globe. This is followed by button-holing the sclera from within at a point midway between the equator and the posterior pole and extending the cut half around the globe. Scissors curved on the flat are passed through this and the optic and ciliary nerves severed. The posterior pole is now grasped with the forceps, drawn forward, the excision of the posterior segment of the sclera is removed. An artificial globe is inserted as after ordinary evisceration.

Suppuration of the Eyeball. Snell recommends treatment as in any other abscess, namely, free opening into eyeball, evisceration as Noyes, Von Graefe, and Bunge advised, but without the scleral sutures, thus preventing inflammatory reaction. The eye is syringed twice daily with sublimate and lightly packed with gauze. The result is usually a cure in fourteen days. For aborting an attack of suppuration hydrochlorate of quinine is given in a 1-per-cent. solution instilled into the eye. The free use of the galvano-cautery in the anterior chamber and even into the lens itself, followed by bichloride injections, is strongly urged by de La Persoune. Ulcers of the cornea are best cauterized with nitric acid, 15-per-cent solution, applied carefully with a soft wooden probe shaped to suit the case. When the proper effect is secured the acid is washed away with normal saline or pure water. Johnson, of Ann Arbor, has used this method for ten years without any ill-effects. Guillery has contributed a valuable paper on the effect of alcohol, morphin, chloral, paraldehyde, sulfonal, trional, cocain, ether, chloroform, tea, and cof-

fee on the motor apparatus of his own eyes. In brief, alcohol weakens the muscles sooner than others; abduction is diminished without noticeable weakness of the interni. Fusion is disturbed. Morphin weakens exterior muscles, especially interni, stimulates sphincter pupillæ and abduction, and leaves fusion and accommodation unaltered. Choral has paralytic action even in small doses compared to its hypnotic influence. It causes mydriasis and lessens abduction and adduction. Only maximal doses of paraldehyde reduce rapidity of contraction of the ocular muscles. Sulfonal and trional are uncertain, but often quickly paralyze the interni, but not the externi, and yet decrease abduction. Cocain has no effect except that of mydriasis. Ether and chloroform benumb the associated and fusion motion. Tea and coffee have no perceptible effect. The circular rotations are lowered by alcohol, stimulated by morphin, and at times depressed, at times unaffected, by sulfonal and trional. The chief discovery was the perfect independence of the associated and the accommodative movements of the eyes. These experiments are quite in harmony with the observation of Stevens in studying heterophorias, a fact mentioned by Boyer in 1893.

Acoin is proving a valuable local anesthetic, but acting poorly in irritated eyes.

Dionin. Darier found by accident that dionin is capable of allaying the pain in iritis, irido-cyclitis, ulcers, keratitis, and glaucoma, the effect lasting for long periods of time. He uses a small mass the size of a "grain of wheat," and places it in the conjunctival sac. The effect is blanching, temporary intense chemosis, and in an hour's time relief from pain.

Euphthalmin is a pure mydriatic, without effect on accommodation or disturbance of cornea. Hale confirms conclusions reached by Wenter and Winselman and Jackson. He uses it in a 10-per cent. solution, one drop twice, at ten minutes' interval. The effect is at its maximum in thirty minutes, and lasts from two to four hours.

I. ABDOMINAL VERSUS VAGINAL HYSTERECTOMY.

BY HENRY O. WALKER, M. D.

DETROIT, MICHIGAN.

The question of the best approach, surgically, to the uterus and adnexa has evidently not been settled, judging from the amount of discussion of late upon this important subject.

Whatever I may offer will not likely be accepted by those who may be advocates of either one or the other methods. It is simply a question whether you can do best what you see, or what you do by feeling and groping largely in the dark. In other words it is working in a light or dark passage. I take it that no operator would be so fixed in his views as to select one of these methods to the exclusion of the other. Removal of the uterus is done for the most part for carcinoma, and it is along this line that I will present the subject.

Cancer of the uterus is not an infrequent cause of death in women. Its early recognition and removal has been so generally recommended that nothing further can be said upon this point other than to dogmatically emphasize the fact. The question, however, of its recurrence is one of important consideration and is immediately connected with the methods of its removal. The manner of recurrence of cervical carcinoma is either by (1) Continuity, that is by extension into the broad ligaments and vagina downwards, and other contiguous parts, as the bladder and rectum and occasionally to the body of the uterus—the adenoid variety attacking the body primarily (2) by Metastasis through the lymph channels, and by distant direct implantation. Authorities are not agreed as to which of these two forms of recurrence is most frequent, yet this is not a point of importance, for it will be an impossibility to diagnose beforehand whether the recurrence is to take place by continuity or metastasis. We are to be gov-

erned in either instance by the method of operation that will offer the best advantages in avoiding a recurrence; and in order to illustrate better what I wish to offer I will describe two pictures, cases that I have operated upon, one of abdominal hysterectomy and the other of vaginal hysterectomy.

PICTURE I—ABDOMINAL HYSTERECTOMY.—MRS. M., age fifty-seven, gave a history of pelvic trouble dating back to her last confinement when she probably had a left salpingitis. Menopause occurred at the age of forty-eight. For two years previous to the time of operation she had a vaginal discharge, bloody and watery, with an offensive odor of late, general condition fair, no cachexia. Vaginal examination revealed ragged ulcerating os uteri together with an indurated and slightly fixed condition of the uterus to the left. Rectal and bimanual manipulation did not reveal whether the fixed point was extension of the disease (which the microscopist stated was carcinoma) or an old inflammatory exudate. Here was an undoubted case of carcinoma of the uterus not so far advanced but that surgical interference was indicated. In the opinion of the writer the abdominal route was the choice of method as offering the best chance for effective work and the best interests of my patient. A long median incision was made and the patient placed in the Trendelenberg position. The omentum was found to be extensively adherent to the left, which was carefully separated from its attachments, ligated and portions removed. As I progressed I found induration extending along the left broad ligament, which was tied and cut away. The extension of the disease was downwards and in the mass was imbedded the left ureter. This part of the operation I scarcely need state required patient industry. I succeeded, however, in leaving the ureter intact and removing all tissue glandular and otherwise well beyond its environments. The uterus was removed in the usual manner, the vaginal opening in the peritoneum closed by two rows of interrupted catgut sutures. I forgot to state that the broken down cervix was previously cut away and the uterine cavity curretted to avoid septic infection as much as possible. The abdominal wound was closed with interrupted silkworm gut sutures without drainage. She made a proper recovery and it is now two years ago the 20th of May last since the operation was done and there is yet no evidence of recurrence.

PICTURE II.—VAGINAL HYSTERECTOMY.—MRS. C., age thirty-seven, mother of five children, labors easy, with a his-

tory of continued uterine hemorrhage not severe for the last three months, latterly with a bad odor. Examination revealed involvement of the cervix, afterwards verified by the microscopist as carcinoma. Bimanual and rectal manipulation did not discover any involvement of the surrounding tissues except an enlarged tube and probably cystic ovary. The vagina was capacious and uterus low down, freely movable, as promising an opportunity for a vaginal hysterectomy as one could wish for. Operation was performed September 9, 1900, after two days' preparation in the hospital, short time enough in any abdominal operation when possible. There was no breaking down of the growth, and as the uterus had been curetted a week previous I saw no use of first cutting away the growth in the cervix. A curettement with blunt instrument was done with irrigation and a carbolic acid tampon inserted into the uterine cavity. Chloroform was used as an anesthetic, the patient having been put in the lithotomy position with a "Clover's crutch." The cervix was seized with a strong Museux forceps and a thorough division made of the vaginal membrane around the cervix well up above the seat of the disease; blunt dissection made anteriorly separating the bladder from the uterus and an opening made into the peritoneum, which was forcibly stretched with the index fingers so as to admit a good size gauze pad. The same procedure was then done posteriorly, first tying the right broad ligament in sections well out from the uterus with a number three catgut suture, then cutting it from its uterine attachment and removing the right tube and ovary, which was accomplished with ease. The next step was the pulling down of the uterus and the application of a ligature on the left side. This was not so easy as I found an enlarged tube and cystic ovary with extensive omental and peritoneal adhesions. The former was tied and cut while the latter was separated with tedious effort, during which time the cyst was ruptured, bathing the parts with its contents, evidently septic. I ligatured with difficulty the broad ligament in sections above the tube and ovary. The vaginal vault and peritoneum was approximated as much as possible, leaving an opening for drainage for the possible infection by the broken cyst and the considerable oozing that occurred, a wise provision as it afterwards proved. The cavity was thoroughly irrigated and a gauze drainage introduced, the vagina being packed with strips of gauze. I will state that the gauze drain was covered with gutta percha tissue, a drainage that has served me best for several years in abdominal

work where drainage was a necessity. The case did well for seven days, when she had a sudden chill and a rise of temperature to 103.5 deg. Fahrenheit. This occurred the following day when I broke with my finger through the drainage opening an abscess containing two or three ounces of pus. Continuing irrigation and drainage she made a good recovery and returned to her home on September 30, 1900. It will be observed that I did not apply the clamp forceps in this instance, which would have undoubtedly expedited the procedure very much.

A seven minute vaginal hysterectomy with clamp forceps is a brilliant feat. Did any of you ever listen to the groanings of a poor victim with these implements of torture dangling between her legs while at every inspiration and any movement of the body she cried with pain? Furthermore did you ever sniff the foul stench in connection with this method of controlling hemorrhage? Did you ever see a poor woman with a leakage of urine from her vagina the result of the use of these same forceps? Did you ever hear the telephone ring in the middle of the night informing you that your patient was bleeding to death when in the afternoon of that same day you had removed these forceps? Would any of you think that it was scientific surgery to leave several forceps in an abdominal operation to control hemorrhage except in an extreme case? I wish at this time to enter my solemn protest against this barbaric act of using clamp forceps in doing a vaginal hysterectomy.

These pictures present, I assume, the true aspect of the subject. The first picture portrays what I never could have done by the vaginal method. The second portrays what I could have done better, safer and surer by the abdominal method. I would not have you understand that under certain conditions the vaginal route in pelvic surgery offers at times equal advantages to that of the abdominal route.

CONCLUSIONS.—All things being equal the abdominal route offers advantages for a more complete hysterectomy than by the vaginal route. First, you are better able to see what you are doing; second, you are much better able to control hemorrhage than by the vaginal route where you are working in a dark cavity; there is less liability of slipping of the ligatures; and if they do slip they are got at more easily than by the vaginal section; third, the danger to the ureters is min-

imized, and if injured the opportunity for repair is better, while if injured by the vaginal route you would have to do an abdominal section to make the repair; fourth, the prevention of sepsis is more certain by abdominal than by vaginal section, aided in the first instances by the Trendelenberg position which gives opportunity for full protection of the intestines and peritoneum, while in the latter the opportunity for protection is limited, as it is an utter impossibility to render perfect asepsis in the vagina where there has been a long standing infectious disease.

II. CANCER OF THE UTERUS AND ITS TREATMENT.

BY STANSBURRY SUTTON, M. D., LL. D.

PITTSBURG, PA.

Throughout the entire century just closing, cancer of the uterus has engaged the attention of the best medical and surgical talent. The evolution of the treatment has progressed from attempts at the destruction of the diseased tissues by caustics, and the actual and galvanic cautery, to the partial or entire removal of the uterus and its appendages.

In the days of Sir James Y. Simpson and his colleagues amputation of the "portio-vaginalis" was instituted. As late as 1878 Schroeder extended this operation to "high amputation" of the cervix, pursuing it systematically and skillfully. Like amputation of the "portio-vaginalis," it was also disappointing in its ultimate results. The mortality of the operation was greater than ten per cent., and as far as could be ascertained less than six per cent. escape a return of the disease.

Almost simultaneously with the inauguration of "high amputation" by Schroeder, Freund, in 1878, devised his operation for total removal of the cancerouus uterus by the abdominal route. Its high mortality and its failure as a curative

procedure have rendered it practically obsolete excepting in cases where the body of the uterus is so large that it is not feasible to extract it through the pelvic outlet.

In 1822, Sauter made the first total vaginal extirpation of the uterus. From 1822 to 1882, the operation made slow progress, its mortality being very high, approximately thirty per cent. From 1882 to the present time, under improved technique, the operation has become almost universal, and the mortality has receded, in cases in which the uterus is still movable, to almost zero. So far, therefore, as operative procedures for the treatment of the cancerous uterus go, we have probably compassed the field, and we now ask ourselves the question, *cui bono?*

The recurrences of cancer after the successful application of probably the greatest gynecological achievement of the century, namely, total vaginal extirpation of the uterus and its appendages, are probably almost as great in number as they were after the "high amputation" of Schroeder. And our colleague, John Byrne, of Brooklyn, claims to have shown after his method of treatment, by curette, scissors and galvanocautery, at least equally good results. Despite the fact that by means of these procedures the proportion of cures has been lamentably small, yet they have brought to suffering women great palliation in this terrible malady. And for this alone they will endure.

We are, however, justified in saying that in order that we may secure more favorable and more reliable results in the treatment of cancer of the uterus than have hitherto been obtained, we must succeed in recognizing the disease with certainty in its incipiency, or, at least, at a much earlier stage than that in which operations for its cure have been instituted up to the present time. Apparently, in view of our present knowledge of this subject it seems a hopeless task to attempt to suggest anything further in the treatment of this malady. Hopeless at it seems, it is our duty to discuss it, and this is my apology for doing so.

The uterus is a hollow muscle imbedded in a network of

lymphatics, which are continuous with the lymphatic system of the pelvis. It is lined with a secreting membrane, mucoid in its character, and extending from the os externum to the outlet of the Fallopian tubes. From its surface, extending into the deeper structures of the cervix, its epithelium forms the lining membrane of many racemose glands. From the surface of that portion lining the body of the uterus, its epithelium lines tubular projections extending to the muscular tissue, the so-called utricular glands. The epithelium covering the vaginal portion of the cervix is of the pavement variety. Just within the margin of the external os it meets with the cylindrical epithelium, which is continuous upwards throughout the uterus and its lacunæ or glands, and throughout the length of the Fallopian tubes. Occasionally the pavement epithelium is carried upwards in the cervical canal to meet the cylindrical epithelium at a higher point, or the cylindrical epithelium may, in case of eversion in a lacerated cervix, be found meeting the pavement epithelium on the surface of the portio-vaginalis of the cervix.

The lymphatic system of the cervix is continuous with the lymphatic system of the body of the uterus, the lymphatic system of the vagina surrounding it, and all together they constitute only a portion of the lymphatic system of the pelvis.

The endometrium or lining membrane of the body of the uterus has been designated as mucoid, because it is not a true mucous membrane. Beneath its covering of cylindrical epithelium its reticular structure is filled with glandular matter, which varies in quantity from the tenth to the seventieth year of life, being more abundant at the age of the greatest fecundity, and gradually disappearing in advanced years. This is a fact which is of more than passing interest in reference to the period in life in which cancer of the uterus occurs. The history of cancer is undoubtedly influenced by this fact.

The disease is exceedingly rare in the young, and not frequent after the sixty-fifth year of life. In the intermediate period from thirty-five to fifty-five it is of very frequent occurrence. Cancer is not of infrequent occurrence in sterile

women, the subjects of fibroma or myoma. The great provoking cause of this disease is apparently the traumatism of child-bearing. Women, with lacerations of the cervix, between the ages of thirty-five and forty-five, constitute a class among whom cancer of the uterus is of very common occurrence. Traumatism is now recognized to be clearly and potently a cause of cancer of the uterus. I have observed but one case of cancer of the cervix under the sixteenth year, occurring in a young girl who had never been pregnant, and, so far as I know, her case presented no apparent causation, not even the chronic catarrhal inflammation which is recognized as a suspected cause.

If there is a constant and specific cause for cancer of the uterus, independent of traumatism and chronic inflammations, it is yet undiscovered.

Returning now to a consideration of our anatomical groundwork, we are ready to consider the pathology of the disease. Our thread of Ariadne running through the labyrinth, has strung upon it the pavement epithelium covering the portio-vaginalis, the cylindrical epithelium lining the cervical canal and its racemose glands, the cylindrical epithelium lining the endometrium, the utricular glands and Fallopian tubes; also the glandular tissue in the reticulated spaces of the endometrium, and the lymphatic system of the uterus and pelvis all imbedded in cellular tissue. These structures are those primarily involved in the pathology.

Every case of cancer of the uterus, whether it begins in the cavity of the fundus or the cavity of the cervix, or at the external os, or on the surface of a papillary growth of the cervix, has its beginning in a cancerous degeneration of the epithelium existing at the point of attack and follows this thread.

For clinical purposes, therefore, the varieties of cancer of the uterus have been designated as epithelial and cylindrical cancers. If the destructive process is superficial, the disease is designated as epithelioma. But if the disease has attacked the deeper structures within the cervix or body of the uterus,

it is designated as carcinoma. The epithelial origin of cancer has been, by Waldeyer, long since demonstrated.

When the disease attacks the mucosa of the "portio-vaginalis," or the pavement epithelium, it not only extends laterally, but it may also progress by continuity of surface through the cervical canal into the cavity of the uterus.

The disease may have its origin in the cylindrical epithelium of the cervical canal below the internal os, and proceed to a destructive stage, the exterior surface of the "portio-vaginalis" remaining apparently free from disease. Or in much rarer cases, the disease may have its origin in the cavity of the uterus, involving all its structures, the cervix remaining free from cancer. The most common point of origin, however, is at the junction of the pavement and cylindrical epithelium.

Should the growth confine itself to the superficial structure of the "porto-vaginalis," it proliferates with great rapidity, producing papillary or "cauliflower" form of the disease. Its beginning is an ulcer with a hard and irregular margin, bleeding in response to irritation. Simple ulceration of the cervix uteri does not exist, and tubercular and syphilitic ulcerations are rare—an important fact in the diagnosis. In cases where doubt concerning the character of the ulcer exists, resort must be had to the microscope.

When the disease has its origin in the distal ends of the cervical glands, a hard nodule or nodules may appear, or be felt beneath the covering of the cervix, or the nodule may protrude into the cervical canal. Later these nodules break down, leaving deep ulcers. When the disease begins in the utricular glands, nodules of cancer develop beneath the endometrium, and later break down, leaving deep ulcers. Later the entire wall of the uterus becomes involved in the process.

Cancer having its origin in the cervix, may, as already said, extend into the cavity of the uterus, or it may involve the vaginal walls, the bladder, and rectum, or following the lymphatics and cellular tissue, implant itself in the deep structures of the pelvis. The disease, when disseminated to this

extent, has passed beyond the domain of surgical treatment, and the patient can only be subjected to anodynes and local antiseptics.

The diagnosis of advanced cancer of the uterus is simple. The hemorrhages, the serous discharges, the existence in the vagina of a "cauliflower" growth, or a crater in the cervix, the margins of which are friable and foul, or a cervical canal having the appearance of a stuffed tomato, being filled full of degenerated tissue, breaking down at once upon application of the curette, should not deceive any one of even limited experience. If upon examination by touch a nodule is felt in the cervix, a diagnosis may not be possible until the nodule is excised, hardened, microscoped, and differentiated from a fibroma. If the "portio-vaginalis" is healthy, and the discharges from the uterus are suspicious, it is only possible to arrive at a diagnosis by removing the endometrium by means of a sharp curette, and subjecting the scrapings to a microscopical examination.

Where the diagnosis of cancer can be made at any stage of the disease, still remaining within the reach of surgical intervention, either with the hope of cure or the aim of palliation, all will agree that the surgeon should proceed to do his best for the good of the patient. In suitable cases he will adopt vaginal hysterectomy, in others, the curette, scissors, and cautery, and in others, anodynes and antiseptics.

The treatment of cancer of the uterus already recognized must depend upon the stage of the disease. Not only is this the fact, but the character of the treatment, whether it be medical or surgical, whether its object be curative or palliative, must vary, and its remote object should, in the interests of the specialist, be clearly defined to the friends of the patient. It is morally wrong to "palm off" upon a patient a palliative for a curative procedure. When cancer has invaded the lymphatic system of the pelvis, and involved the bladder or rectum, total vaginal extirpation of the diseased organ is useless, and should not be undertaken.

When the surgeon has the good fortune to detect a cancer

of the cervix or cervical canal, or even of the endometrium, in its earliest beginning, total vaginal extirpation holds out not only the prospect of palliation, but the prospect of an occasional cure. Cases of uterine cancer which have progressed to a stage of extensive ulceration, and present well-defined symptoms without marked lesions of the neighboring organs, may be subjected to total extirpation, with the hope of palliation, but without the prospect of a cure, save in very exceptional cases.

Many cases wherein total extirpation is not deemed advisable may be treated by means of the sharp curette, scissors, and the actual or galvanic cautery, with subsequent antiseptic dressings, with the hope of palliation, in increased comfort, and life is thereby often prolonged.

The surgical operations for the treatment of cancer of the uterus have but one object, namely: the removal of diseased tissue, as completely as is possible, by curette, scissors and cautery, or by total extirpation of the entire uterus, with or without the ovaries. Having full faith in the operative ability of my colleagues, I refrain from any advice as to how they should do these operations. Thoroughness of procedure, with attention to the principles of modern surgery, are the great requisites to success. Notwithstanding the thorough application of these principles to the management of cancer of the uterus already existing in patients presenting themselves for treatment, we are bound to conclude after carefully weighing the clinical results, that life is prolonged beyond a few months in but a small number and that the cases cured comprise but a small fraction of the entire number treated.

If the victims of cancer of the uterus are to be reduced in number, the disease must be recognized in its incipiency, or a prophylactic treatment must be instituted to prevent the occurrence of the disease.

I desire now to ask the attention of my colleagues to some remarks in the discussion of prophylaxis, in properly selected cases in which a diagnosis of cancer cannot be arrived at, yet in which the symptoms point toward the advent of can-

cer. They belong largely to a class of women between the ages of forty and fifty, who are frequently encouraged to bear their ills by the illusive idea that they are passing through the "change of life." This class of women furnishes the greatest number of cases of cancer. Lulled to indifference by this most dangerous idea of the "change of life," they hide their symptoms until they are finally driven to some one who discovers too late that they have cancer of the uterus.

Reference to my own notebook reveals the fact that the average age of patients applying to me with cancer of the uterus is forty-three years and two months, and that the disease has been far advanced when they presented themselves. Many of them have been beyond the reach of any treatment, excepting that of anodynes and antiseptics. In all of those to whom surgical procedures promised any relief operations were extended.

These operations consisted of total vaginal extirpation or ablation of the cervix, with or without the application of the actual cautery. The average duration of life in these patients after operation has not exceeded eighteen months. Notwithstanding this a few are free from the return of the disease after several years. This experience is not unique; it is the experience of all operators. From such experience we must conclude that operations for advanced cancer of the uterus are very unsatisfactory in their results.

As already stated, the average age of my patients coming up for operation with the disease well advanced is a fraction over forty-three years. If a prophylactic measure is to be extended to this class of cases, it must be done not later, as a rule, than in the fortieth or forty-first year. But, out of rule, it may be extended to any suitable case occurring prior to or after that period.

With but one exception, the women whose cases have been here considered had borne children. These had all incurred laceration of the cervix. The picture presented by each and all of these cases at the average age of forty years, or three years prior to presenting themselves for operation, was as

follows: the uterus was somewhat hyperplastic, its depth was increased, an endometritis and a lacerated cervix existed with profuse or irregular menstruation, and, in the majority, disease of the uterine appendages was present. If at this period these cases have been subjected by their physicians to the routine treatment of curetting the uterus, wiping it out with a strong chemical solution, and following this by trachelorraphy, or biconical section, with or without removal of the uterine appendages, some of these cases would have been rescued from future cancerous degeneration. It is unreasonable to suppose that all would have escaped. But had all of these women at the average age of forty or forty-one years been subjected to total *vaginal hysterectomy,* not one of them would have suffered subsequently from cancer of the uterus. By reason of prior hysterectomy, the mortality would not have exceeded* four per cent, and this would stand against almost one hundred per cent mortality within eighteen months after the operations were done by reason of existing† cancer.

In all cases in which there is marked disease of the uterine appendages, the treatment by curetting and trachelorraphy or biconical section is insufficient to secure the patient against the future. In those cases where disease of the appendages is not apparent, curetting, biconical section, or trachelorraphy may be considered sufficient. But in both classes of cases at this period of life *I believe that total vaginal hysterectomy is justifiable and advisable.*

My colleagues may regard this as very radical, but the treatment of cancer of the uterus, after the disease has been established, save in exceptional cases, is a failure. If we are to improve upon present conditions it must be in the more extensive repair of lacerations of the cervix in the earlier years of the child-bearing period, *and in the inauguration of radical treatment by hysterectomy, when the conditions leading up to cancer are discovered.*

So far as it is possible, every child-bearing woman should

*My own mortality in last 25 cases.

†My own results and those of other operators, also.

be kept under observation, and especially between her fortieth and forty-fifth years, that the condition of her pelvic organs toward the close of her child-bearing period may be determined, and that she receive the best treatment indicated for her future immunity from cancer of the uterus.

Some practitioners of medicine do not realize the importance of those symptoms which are so frequently the precursors of cancerous degeneration in the uterus, and some few fail to recognize the disease in its earliest stages. An improvement in this direction or an earlier resort to consultations with the more experienced will result in good.

To put my view more forcibly before the reader, let him consider it from the standpoint of a mathematical problem:

Given one hundred cases of uterine cancer treated by vaginal hysterectomy—result: four deaths, ninety-six recoveries. Credit the latter with an average of two years of life after the operation; thus we have the result: gain in human life, 192 years.

Given the same one hundred cases subjected to vaginal hysterectomy from two to three years earlier, prior to the advent of cancer. Result: deaths, four; recoveries, ninety-six. Credit the latter with an average of ten years of life after the operation. Thus we have the result: a gain of 960 years of human life. Take the difference in these results, viz.: 768 years of human life, in favor of prophylactic operating, viz., operating before cancer has become installed.

DISCUSSION.

Dr. Edward W. Lee, of St. Louis, Missouri.—The papers just read need no criticism, but emphasis. I would emphasize strongly the abdominal method of hysterectomy in comparison with the vaginal. The conditions are more favorable for the abdominal than the vaginal route. The abdominal operation can be more easily done; the surgeon has control of the tissues involved; he can see what he is doing, and he is not

liable to do the injury that he might possibly do by operating through the vagina. Furthermore, the condition in which the patient is left is far more favorable and better than it would be were the operation done through the vagina. As Dr. Deaver, of Philadelphia, has very pertinently emphasized the point that a surgeon would not attempt to make an amputation of the breast for carcinoma at the present day without thoroughly extirpating all of the enlarged glands in the axilla, no more so should we attempt to remove a cancerous uterus without thoroughly dissecting out all the lymphatics that may be involved in connection with the uterus. The adnexæ should be removed along with the cancerous uterus. To remove the uterus and leave the ovaries, broad ligaments, and Fallopian tubes, as well as the adjacent tissue intact, is a good deal like removing the breast and not taking away the axillary glands. It is wrong. The treatment of cancer of the uterus cannot be too radical. The only condition in which I believe the vaginal operation is indicated is in cases of small fibroid tumor of the organ that can be shelled out easily, and when we know that there are no other complications. It is dangerous to attempt to hold the uterus and pull it down to do a vaginal hysterectomy. We must know absolutely the condition of the ovaries and tubes, as well as the extent of the adhesions, before we attempt to pull down the cervix. Even in the ordinary operation for laceration of the cervix a great deal of injury has been done by seizing the uterus with strong vulsellum and pulling it down. By this means adhesions have been broken up, and pus tubes have been ruptured, ending in general peritonitis. In the removal of the uterus I contend that it is almost criminal to pull the uterus down, as I have seen some men do, not knowing positively the condition which existed in the pelvic cavity, and in a stout patient it is utterly impossible by bimanual examination, or by physical examination, to determine the condition of the Fallopian tubes and structures adjacent to the uterus. A great deal has been said and written upon this subject, and I think the day is fast approaching when surgeons will abandon the vaginal for the abdominal route.

With reference to the paper of Dr. Sutton, it needs emphasis and not criticism.

Dr. Chauncey D. Palmer, of Cincinnati, Ohio.—The method of procedure in operating for fibroid tumors or can-

cer of the uterus, whether by the abdominal or vaginal route, cannot reasonably be settled either way. The tendency now is to resort to the abdominal method more frequently than the vaginal. For the past several years the vaginal method has been the only route.

The gentleman who read the first paper (Dr. Walker) told us that it is very important to remove all of the diseased structure. Unquestionably we can do this more satisfactorily by the abdominal than by the vaginal route. The relation which exists between laceration of the cervix uteri and cancer of the uterus, especially from a causative standpoint, is so clearly defined and so thoroughly appreciated, by many physicians, that it ought to be recognized by all of us. In the vast majority of cases cancer of the uterus exists in parous women. We may have true cancer of the body of the uterus in a virgin or in an old maid, or in any nulliparous woman. Several years ago I removed quite a large colloid cancer from the ovary of a little girl but six years of age. Cancer does exist in all ages, but it is rare to find it except in the parous woman. It is five times more frequently found in the uterus than in any other part of a woman's body, and in the mammary gland it is three times more frequently detected than in any other part of her body.

We should remember and recognize the fact that if we are to prevent cancer of the uterus, we should remove the conditions which lead to the formation of it, namely, the cicatricial tissue, resultant on injuries of the cervix which come during parturition. Therefore, any woman who has a considerable tear of the cervix uteri, with the formation of cicatricial tissue in the intravaginal portion of the cervix, filling it out, exciting local irritation, at that point where the squamous epithelium of the infravaginal portion of the cervix joins with the cylindrical epithelium of the cervical canal, should undergo an operation for the repair of the cervix. Again, every woman, whether she has a cervical catarrh, an eversion, an erosion or granular degeneration of the cervix, or a hyperplastic condition of the cervix, as the result of a laceration, should have it attended to, if for no other reason than that it may prevent the formation of cancer in future years.

DR. J. WESLEY BOVEE, of Washington, D. C.—It is rather unfortunate that the radical operations mentioned for this

disease are termed hysterectomies, because in the light of medical progress in the treatment of it, hysterectomy is only a small portion of the operation. The operation is one of eradication, and I do not think the ordinary hysterectomy is an eradication. According to the statements that have been made regarding the lymphatics, there are three classes of cases in which vaginal hysterectomy for cancer of the uterus, with what other structure may be removed by that route, is advisable. One is in cases in which we feel satisfied that the entire cancerous mass cannot be removed. In those vaginal hysterectomy may be done, and the comfort of the patient for the remainder of her days will be much increased. In the second class we have those women who have unusually thick abdominal walls; if the vagina be large, the vaginal operation may be found less difficult. In another class of cases we have patients to deal with who are very feeble, who are not able to stand a prolonged or tedious operation. Ordinarily, I would do hysterectomy by the abdominal route, or I would do an operation, rather, and it should not consist of the near removal of the uterus, but the appendages, and I think a combined operation along the line advised by Ries, Clark and Werder is the best. It is the method I have been following and I have thus far done thirteen operations by that combined method. Fortunately they are all living today, although two of them have recurrences. The operation is almost exclusively an abdominal one. Unlike Dr. Palmer, I begin by the abdomen and finish by the vagina. In two of my cases I found it necessary to cut two inches of the ureter where it was passing through the cancerous mass. In one case I transplanted the ureter into the bladder. The mortality cannot be very high, although it is a tedious and a long operation.

So far as prophylaxis is concerned, I believe that in every woman approaching the menopause, in whose case for any reason the abdomen has to be opened, and the condition of the patient will warrant further procedure, the removal of the uterus and appendages is advisable. I never leave the uterus of a woman over forty years of age in which there is marked disease, the reason being along the line mentioned by Dr. Sutton. I agree with him that the results in these cases are not so promising as to warrant us in telling patients that they will get complete relief from the condition, but we have a right to give them great hopes of cure.

DR. A. H. CORDIER, of Kansas City, Missouri.—I have enjoyed the papers very much. This subject has been discussed before every medical society, particularly that phase of it which pertains to prophylaxis. I do not agree with Dr. Sutton, if I understand his paper correctly, in recommending the removal of the uterus as a prophylactic measure. I do not agree with Dr. Bovee in recommending that the uterus should be removed in all cases in women under forty years of age in which the appendages are diseased and require removal. In every case, in which there is a laceration of the cervix, I would advise its repair, as has been suggested by Dr. Palmer. Each case is a law unto itself and should be operated upon according to its own merits. This point was very well brought out in the paper of Dr. Walker, who cited two interesting cases, in one of which he operated through the abdomen, in the other through the vagina. In cases that are far advanced, I do not believe we are warranted in subjecting them to such a radical procedure as extirpating the glands extending up to and along the abdominal aorta, because in such instances it matters not how radical the operation may be, a hundred per cent of them will recur. Those who have advocated such a radical procedure—Kelly, Russell and one or two others—have abandoned it. Dr. Kelly told me that he had given up this procedure for the reason that the disease had recurred in many instances. Those of you who have seen the disease recur will remember that it does so invariably in the vaginal wall, at the lower angle of the broad ligament, or in the vagina, at the lowest point at which the incision was made. In those cases in which there has been extensive involvement of the cervix, the disease implicating the bladder wall and rectum, so to speak, the patients have been very much benefited by thoroughly curetting the mass, applying the Paquelin cautery, burning it off as much as possible, and then packing the parts with carbide of calcium, a remedy which was first brought before the profession in this country by the late Dr. Etheridge. I have been in the habit of doing this three or four times a week, and in addition have used the Goodell solution of permanganate of potash as a vaginal injection. While I do not believe that this method will cure patients, it certainly gives them great comfort, makes life more endurable, and it is absolutely safe.

DR. HUGH A. COWING, of Muncie, Indiana.—Just a word or two as a general practitioner on this subject. The remarks of Dr. Cordier in regard to the after-treatment of these cases are quite pertinent, as many of these cases after operation are left to the general practitioner for treatment. We see them first, and often we see them last. I would like to reiterate what was said in the paper of Dr. Sutton concerning the necessity of early diagnosis on the part of the general practitioner. The specialist has probably arrived at the acme of perfection in operating, but much remains on part of the general practitioner to make an accurate and early diagnosis of cancer of the uterus, and as the general practitioner improves in his ability and perfection of diagnosis, so will we improve in the satisfactory treatment of cancer of the uterus.

I am grateful to the gentlemen for their discussion along the line of treatment.

DR. W. F. BARCLAY, of Pittsburg, Pennsylvania.—It seems to me that the duty of the general practitioner in the treatment of cases of cancer of the uterus has been very fully set forth in the papers that have been read. From a very considerable experience, I must say that the general practitioner is, perhaps, to blame in not referring these cases early enough to the specialist. I have made it a rule, when I was not clear about the diagnosis of disease of the uterus, when the patient complained, to refer the case to a specialist, and I have always been well satisfied, because it is very evident from the consensus of opinion here that the earlier these operations are done the greater the prospect of prolonging life and perhaps of curing the disease. The prospect of effecting a cure, when the disease is well advanced, is pretty well eliminated. I think it is wise in our medical schools to teach more thoroughly and more effectively than has been done heretofore the science of obstetrics. We certainly appreciate, from what we have heard here today, that this disease is largely one due to traumatism, and I suppose that from my experience and observation the obstetrician is in many instances to blame. I have made it a rule for many years to see all women, whom I expected to take care of in confinement, beforehand. I have declined to attend a woman in labor unless I could see her beforehand and look after her general health. I am satisfied that very much less injury would come to the parturient

woman if she would only consent to being seen and examined before confinement and her general health carefully looked after.

DR. WALKER (closing the discussion).—There is very little that I can add to what I have already said in my paper. The principal object of the paper was to bring out certain mooted points in dealing with malignant disease of the uterus.

I do not agree with Dr. Bovee in reference to the name of the operation because I do not see how we can call it anything else. It must be called a hysterectomy, either abdominal or vaginal.

I was favorably impressed with the remarks of Dr. Cordier in reference to curetting the cancerous mass in these cases, and then applying carbolic acid, or the actual cautery etc., thus giving these patients comfort and prolonging their lives.

In resorting to the abdominal method we can protect the surrounding structures by means of antiseptic pads introduced through the abdominal opening, and we can wall off large areas just as we do in the operation for appendicitis before rupture of the sac occurs, and in this way prevent infection of the peritoneum and intestines. This point is of great importance in the abdominal as compared with the vaginal operation.

III. TRACHELOPLASTY.

BY HENRY PARKER NEWMAN, A. M., M. D.

CHICAGO.

The Normal and Pathologic Significance of the Cervix Uteri.

Thirty years of progress and research in medical science have not shaken materially the theory of Montrose Pallen, who in 1867 in a prize essay read before the American Medical Association enunciated these propositions: (1) Menstruation irregular in its character is always coincident with uterine disease. (2) All uterine abnormalities tend to a deformity of the organ, either in its neck or in its body, or in both. "The healthy functioning of any organism necessitates a healthy condition for its performances," and, "no unhealthy cause can produce healthy effects; therefore, from a uterus abnormal can no healthy menstrual flux proceed"; and whereas he later qualified these statements by saying that "irregular menstruation may depend upon systemic causes wherein the uterine disease is but functional and symptomatic," we ourselves know that these are the exceptions and that the great majority of our cases are of the kind that prove the rule. Even when the cause is systemic, too often its persistence leads to a state of chronic functional disturbance of the uterine system, and we have a condition calling for local investigation and treatment.

At the time Pallen wrote, lesions of the cervix uteri, such as lacerations, malformations and stenosis, were among the most prolific causes of gynecic disease, and many operations and instruments were devised for their correction. Since then there has been great advance in gynecology and obstetrics, and in prophylactic medicine, with the result that many of the factors which brought about these conditions of the cervix have been eliminated from modern life, and the pelvic organs of woman have a better outlook during the develop-

mental period of childhood and puberty, and are more judiciously conserved during childbirth and the puerperium. At the same time there is still to be found in the faulty methods of education, dress and diet, careless midwifery, and the "strenuous life," too much cause for malnutrition, maldevelopment and traumatism of the genital tract. Take, for example, the cervix, a delicate organ, whose function is to soften and dilate during menstruation and copulation, to undergo easy and natural changes during pregnancy and labor; too often it is found instead contracted and resistant, setting up a barrier to healthy menstruation, becoming a storehouse of infectious germs, and giving rise to a long train of obstinate evils. Even in a uterus which seems to have a fairly free outlet at the cervix, the hyperemia which accompanies the monthly molimen may bring the cervical walls so closely in apposition that the flow is materially retarded and the secretions more or less retained. Retention of the secretions gives rise to an elaborate sequence of allied diseases, such as endometritis, metritis, salpingitis, oophoritis, etc.

Importance of Cervical Function. When we have under observation the sufferer from chronic metritis, with her full allotment of general and special ills, her dyspepsia, neuralgia, headache, backache, anemia, nervous symptoms and very natural mental depression, we cannot but be convinced of the importance of a function whose disturbance has resulted so disastrously. We realize also that our work should be directed to the one end of re-establishing and maintaining a condition of the tissues which shall permit the regular and normal functioning of this organ.

In the milder cases we may choose between a prolonged course of routine, palliative treatment, and the more radical surgical procedures. In the graver, where there has been extension to the tubes or ovaries, salpingo-oophorectomy, ovariotomy, or hysterectomy may become necessary to remove the local effects of disease, but not always with hope of bringing back a normal degree of health in a constitution injured and disturbed by long presence of diseased conditions.

Improved Technique in Operating. In selecting a method of surgical repair of the cervix uteri, we should remember that that is most excellent which required least preparatory and after- treatment, and which exacts least in the way of time and patience from patient and physician. And here let me remark that there is a reaction against the tedium of routine local treatment that bids fair, like all reactions, to go almost too far and abrogate it altogether. It is certainly a detriment to the average patient to be subjugated to prolonged topical treatment. It has a tendency to establish the habits of invalidism, and to fix the attention inward, which is not a healthy stimulus to recuperation. I have for some years sought to do operative work of such a character that as much as possible may be accomplished at one sitting, and the patient led to expect prompt recovery and encouraged to consider herself free from bondage to the gynecologic chair. My results have so far been satisfactory. Though my manner of operating differs materially from any so far described it possesses certain advantages which I hope will commend themselves in comparison with existing modes. We have seen the passing or reconstruction of the older methods within very recent times, but as yet there is no unity in choice of technique, and this lack of agreement perhaps lays us open to the sweeping criticism of Dr. van Ramdohr, who remarked that "as long as there are twenty-five methods of doing a thing none of them is good." This has only a measure of truth in it for the progress of surgery is marked by the passing of modification after modification of good methods, and the road still leads on to perfection.

Emmet himself, whose brilliant former work seemed so nearly the final achievement, has so far abandoned his famous operation for laceration of the cervix, that he limits its performance to cases which scarcely exist in modern practice, saying that "with but few exceptions amputation is the proper means to employ * * * for the relief of pathologic laceration of the cervix as it is now met with."

I believe that there can be no dissenting from this proposition today although it may not be out of place to note some of the views of recent writers on amputation as it is generally performed. Early in the history of the operation Pauly is quoted as saying, "of all surgical operations the excision of the neck of the womb has hitherto been the most murderous." Dr. A. Palmer Dudley, of New York, objects to the prevailing technique, that is the older method of Schroeder, Emmet, Pozzi and others, on the ground that: "In closing the womb one is very apt to narrow the canal to the extent of obstructing the escape of the normal discharges from the uterus, thereby injuring the woman instead of benefiting her. Many can recall cases in which, before operating for laceration of the cervix, they could recognise no disease of the uterine appendages, while afterward disease developed. Why? Simply because in repairing the cervix they closed it, prevented the normal discharge from the uterus, induced continual passive congestion of the endometrium and the disease then traveled up the tubes."

Hegar and Schwartz claim that the Sims method allows blood and serum to collect behind the sutures, and Thornburn considers the use of stitches unnecessary.

The American Text-Book of Gynecology says of amputation by the galvano-cautery, which is still used by some, that its only commending feature is its bloodlessness. Confidence cannot be placed in it and it is therefore illegitimate.

The objection to removal of diseased cervical tissue by the curette is that in this organ, whose mucous membrane differs from that of the uterus in essential particulars, chronic inflammation creates a dense, firm tissue with deep glandular involvement which only a sharp curette thoroughly used can remove. Such removal is apt to result in constriction of the canal amounting to a severe stenosis or even atresia unless followed by tedious and objectionable after-treatment.

In advocating amputation of the cervix for inflammatory conditions L. Touvenaint (France) says: "The curette, which gives excellent results in chronic corporeal endometritis,

is altogether insufficient in cervical endometritis. The operation (amputation) gives brilliant results preceded by curetting; we say 'preceded by curetting,' because it is rarely the case that inflammation of the cervix has not been propagated

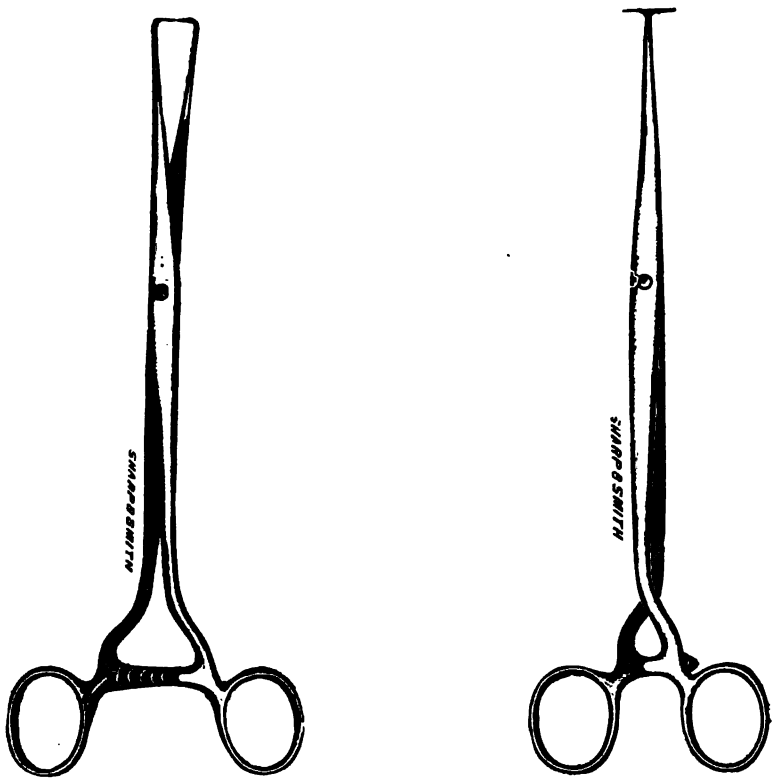

FIG. I. The author's tenaculum forceps. The blades can be made to pass each other and point outward without unlocking.

to the cavity of the body, and the endometritis became general. * * * Amputation is not done solely for the sake of removing a part of the organ; it possesses also the advantages of inducing profound modification in the vitality of the entire uterus, so that this undergoes a veritable involution."

The form of amputation which I practice I prefer to call by a more distinctively descriptive name.

Revival of Term Tracheloplasty. Amputation conveys the sense only of the taking away of the diseased organ, whereas

the object of ideal operating is the removal of adventitious tissue only, the restoration of anatomic conditions, and re-establishment of normal function.

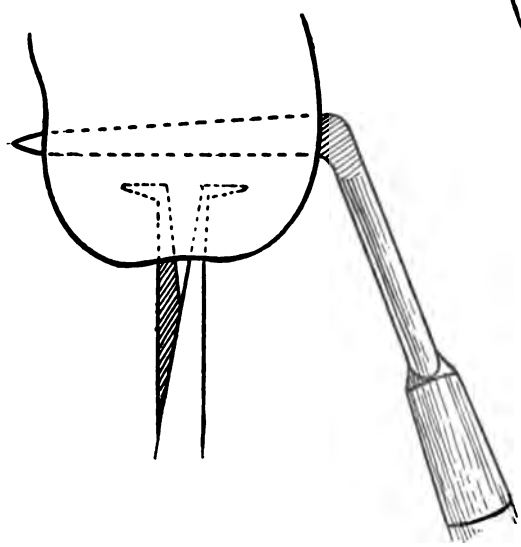

FIG. II. (a) Right-angled or tracheloplasty knife. (b) Cervix transfixed preparatory to making flap: forceps readjusted within cervix.

FIG. III. Formation of flaps. Plug of pathological tissue grasped by forceps and ready for excision with curved scissors just above the tenaculum points.

I had called my work tracheloplasty in reference to its nature and intent before I knew that Parvin had once given the same name to the early work of Emmet. As the latter never accepted it and as I find it most aptly fitted to my use I have adopted it and shall continue to designate by it the following operation:

The Author's Operation. The patient being surgically prepared is placed in the lithotomy position and the cervix drawn down with a vulsellum forceps, bringing the uterus well into view. The cervix is dilated and the uterus curetted if indi-

cations for curettage exist. These are, however, so nearly constant as to make it practically the rule. The cervix being drawn down with the bullet forceps or a double tenaculum, the blades may be reversed and replaced within the cervix so that their points are directed laterally from within outward, but I prefer to use the specially devised instrument which you see here. (Fig. 1.) By using it in this manner

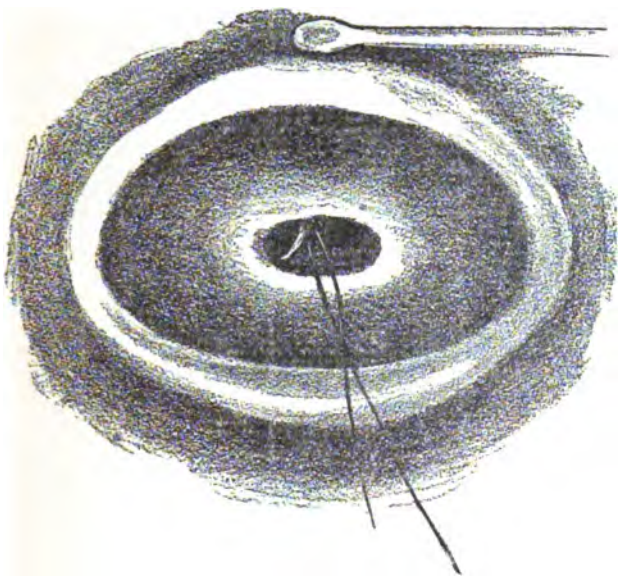

FIG. IV. The plug of the tissue is removed and flaps falling inward are ready for stitching

traction is made upon the inner area of the cervix, leaving the anterior and posterior walls free for making the flaps. The cervix is now transfixed by this special knife (Fig. 2) and a clean cut made from above downward, first in the posterior lip. The anterior lip is transfixed in a similar manner about one centimeter or a centimeter and a half in front of the other and cut in the same way.

The intervening plug of diseased tissue is now removed by a single cut or two of the curved scissors, the bullet forceps having been changed to a lower position to allow it (Fig. 3). The flaps thus made will now fall together and inward

so as to assume the appearance of a normal cervix and will require only the simplest suturing to keep them in this position. (Fig. 4.) The first suture is passed through the cen-

Fig. V. Needle with fixed holder.

ter of the anterior flap a centimeter or more from its cut edge and brought out about three-fourths of a centimeter within the cervical canal. Two parallel stitches are now placed at each angle of the cervical canal. Silkworm gut is the suture material I commonly use, and the employment of this fixed needle and holder (Fig. 5)' renders an otherwise difficult procedure quite easy. The posterior lip is treated in the same manner except that here it is easier to pass the sutures from within outward while the reverse is true in sewing the anterior lip. Two sutures are now passed, as in trachelor-

rhaphy, through the outer angles of the wound which gape slightly after the turning in of the flap. For nice adjustment of the stitches and for ease in removal I am in the habit of treating them in this way: In tying the sutures one end of

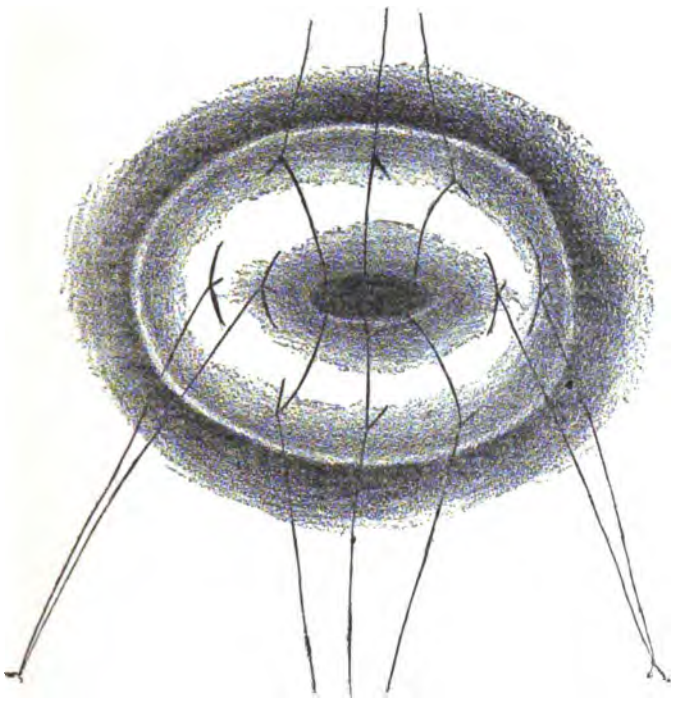

Fig. VI. Showing stitches in situ and manner of tying in groups.

each is left long and these long ends are grouped by tying them together according to their location. The three anterior sutures form one group, the three posterior one group, and the two lateral sutures are tied together, a pair on each side, making four groups in all. (Fig. 6.) A uterine tampon of iodoform gauze or wicking is now inserted by means of this forceps and tampon-carrier (Fig. 7), a projecting strand being attached to the vaginal gauze tampon in order that both may be removed without undue disturbance of the parts. If no accessory work is done the usual perineal dressings are applied and the patient put to bed. The external genitals are bathed with antiseptics after micturition but no douch-

ing of vagina or disturbance of tampons is allowed until the second or third day when the entire tampon is removed and not replaced. Vaginal douches of 1-4000 bichloride are then used twice daily. The sutures are removed at the end of two weeks when the patient can be up.

FIG. VII. The author's tissue forceps and uterine tampon carrier.

The advantages of this method are: (1) Quickness and ease of operating by the knife here presented, the manner of making the flaps transcending in certainty and safety of execution the ordinary methods of excision. (2) Clean, smooth-cut surfaces obtained without haggling of tissues. (3) The easy approximation of flaps and the avoidance of all hemorrhage beneath them by deep placing of suture and compression of the flaps. (4) The accurate approximation of mucous membrane to mucous membrane, thus avoiding granulating surfaces, formation of cicatrix and constricting of the canal. (This feature which also pertains to Schroeder's ope-

ration is of great importance and a decided advantage over trachelorrhaphy, especially where the entire mucous membrane is removed.) (5) The certainty of obtaining a permanently patulous canal and a well-formed cervix with pronounced reduction of the hyperplastic uterus. (6) The simplicity of the after-treatment.

Finally plastic gynecological work to be ultimately successful should not be done piecemeal. The operation I have described is seldom called for alone. The neglect to do necessary complementary operations brings frequent failures. While trachelorraphy will often correct a simple displacement of the uterus due to inflammatory conditions with increased size and weight by correcting the lesion of the cervix and the accompanying metritis and by stimulating involution, its value may be greatly enhanced by such reinforcing work as shortening the round ligaments or suspensio-uteri where there is displacement of the uterus; divulsion and curetting when disease has extended to the endometrium above; reparation of the pelvic floor when, through relaxation or trauma in childbed, there is hernial condition of rectum, bladder, vagina or superimposed viscera; even opening of the abdomen for plastic work or resection in pathological conditions of ovaries, tubes, etc.

Any one or all of these accessory operations may be necessary to the restoration of the patient although the diseased or deformed cervix was the essential, perhaps the sole etiological factor in her case.

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DISCUSSION.

DR. J. H. TAYLOR, of Indianapolis, Indiana.—As a general practitioner, I wish to say a few words regarding the excellent paper just read by Dr. Newman. In my judgment it is an important one and should be freely discussed. He has given us a concise and fair statement of the technique of his operation. I agree with him in one statement, that the uterus, as a rule, should be curetted, because if it is not, when the patient presents herself subsequently to a general practitioner or specialist to have an operation performed, it prejudices those to whom she mentions the fact that she has been relieved, but she had to have a secondary operation. In other words, it prejudices them against the operation which was first performed. There may be twenty-five or more different methods of performing this operation, but I think Dr. Newman deserves credit for his courage in presenting this unique and clean method of making this operation, and I am sure that we will get better results than we do with the ordinary methods. Many a time I have watched the specialist chisel off portions of the uterus, leaving little cicatrices result which produced subsequent pain, and the patient felt that she was not cured.

DR. NEWMAN (closing the discussion).—In my paper I endeavored to point out the indications for tracheloplasty, and just before leaving home I had a drawing made of cervical tissue, so that you might understand how futile it is to do the ordinary trachelorraphy in such cases. This was one of many that we operate upon almost daily in which the endometrium is entirely involved. It is not a mere surface involvement, but the deeper structures and even muscular layers are also infiltrated with connective tissue. By removing a V-shaped angle on each side of the cervix and curetting the entire endometrium, we always lay our patients liable to stenosis of the cervical canal. But that is not all. In doing that we do not remove all the infected tissue. You have all found the glandular structures involved for one-third of an inch or more in depth and retention cysts to the very outer edge of the cervix.

These cysts represent the glandular structures that have been previously infected. The operative procedure I have described does away with all unhealthy tissue and reconstructs the cervix. In doing plastic work, I maintain that we should not be restricted to a single procedure, but adapt out method to the individual case. The method I have outlined is practically a reconstruction of the cervix after having removed all the diseased tissue. The drawing I have shown you is an exact reproduction of what no doubt most of you have seen many times. I can safely recommend the method to you.

IV.—POST-OPERATIVE INTERNAL HEMORRHAGE.

BY A. H. CORDIER, M. D.

KANSAS CITY, MO.

Recognizing the immediate tolerance of the peritoneum to extensive handling by clean hands and aseptic instruments, the surgeon of today is disposed to look too lightly upon the remote results of such manipulations. Extensive bowel and other adhesions are separated with a recklessness in some instances that seems almost appalling, yet nature covers the denuded surfaces in most instances with a security deserving much credit; bleeding surfaces are left for the efforts of nature to take care of or control. If a similar hemorrhage in other parts of the body should occur during an operation, the surgeon would not think of leaving it to nature's efforts.

Patients are lost frequently from a post-operative intraperitoneal bleeding that should have been averted, or having occurred, controlled by a timely reopening of the peritoneum. I know of no condition in my work that is more horrifying than to realize that a patient upon whom I have just performed an abdominal operation is bleeding dangerously. I know of no condition under which the surgeon will more

quickly realize the importance of his work and appreciate more fully the great responsibility existing in every abdominal operation.

An avoidable accident to a patient that may result in the death of that patient is a very serious matter, and should not be passed as a trifling affair by the surgeon. Trying to give contentment to the sorrowing family and friends by assuring them that the allwise Providence willed it so may satisfy the unsuspecting and confidential family circle; but does it relieve the mind of the surgeon or save the patient? No.

The use of unstable ligature material on large pedicles, and in localities where the same is quickly absorbed, has cost quite a number of patients their lives from post-operative bleeding.

It has been my misfortune to lose one patient from a post-operative hemorrhage. The cause being the use of catgut ligatures, after a large series of cases in which I used silk (I use it altogether now) without an accident of this character, I was persuaded to use catgut in a simple and easy case. This case was in a private residence in a distant city. Three hours after operation my patient died from hemorrhage, the result of a slipped catgut ligature. I know that the ligature was responsible for this death. It should have been avoided. Dispensations of Providence are garments that may be used to hide the naked truths from the ever credulous public, but before the eyes of the conscientious surgeon he sees the slanderous injustice of hiding his blunders under such sacred raiment.

That many fatal post-operative hemorrhages are unavoidable, no one will deny, and it has been the experience of most every surgeon to have had such.

The recognition of the possibility of a patient bleeding to death following an operation only makes the surgeon more careful to avoid it and to resort to the best methods of speedily checking it when it has taken place.

There is no condition in which quick surgery is more essential. I mean by quick surgery not alone the getting at the work quickly, but rapid work after the secondary operation

has begun. A patient who a few hours previously has gone through a severe operation probably of long duration or of a character to produce shock is not a very good subject to whom to give an anesthetic and undergo a reopening of the peritoneum. If the surgeon does not recognize this the majority of his reoperated patients will die. No chronic or deliberate surgery can be tolerated by such a patient.

In a late paper I noticed that the surgeon regrets very much his efforts at saving two patients suffering from post-operative bleeding. In his histories he says after re-anesthizing the patients the uterine arteries were ligated per vaginam and the abdomen opened and bleeding vessel secured. Both cases died. Why? Because too much time was used in securing the uterines, too much blood lost before bleeding vessels were tied through the abdomen and because the whole time of anesthesia was more than the patient could stand.

Pathological discussions and other time-consuming topics should be postponed while checking a post-operative hemorrhage.

Prophylaxis has here its best application. All vessels liable to bleed should be tied at time of operation—silk being the safest ligature material.

The use of Trendelenburg position, while it enables the surgeon to see the bleeding points and to tie them more efficiently, may by gravity in a patient with a weakened heart keep a vessel from bleeding during the operation that may bleed profusely on the patient's assuming the horizontal position when placed in bed. This is especially true of capillary oozing from adhesions.

The drainage as has been urged by Price and others is not only valuable as a sentinel but has a direct hemostatic power. All recognize the necessity of a clot, firm in character, to control oozing or even bleeding from larger vessels. Blood in the air-tight peritoneum, in the presence of a peritoneal temperature and abundance of lymph, will not coagulate quickly or at all firmly, as all will agree who have opened the peritoneum in ruptured tubal pregnancy or other conditions where

there has been a free intraperitoneal bleeding. A drainage tube in suspected cases for a few hours will do no harm and will surely give the indications of a hemorrhage. If the bleeding is from small vessels the keeping of the peritoneum dry will be a potent factor in controlling the bleeding. Of course the tube should not be used unless some reason is present for its use.

While the tube is of much use in suspected cases its utility is lost in the cases where a hemorrhage occurs in a patient in which such an accident is not expected. Thus my three post-operative hemorrhages have been in easy cases where such was least expected. My other secondary operations for bleeding have been in patients of other surgeons. I was called in their absence to save the patients, in each instance having succeeded.

Late researches in hematology claim that an internal concealed hemorrhage may be demonstrated by a careful blood count. This it is claimed will show a decrease in the red cells, and increase in the white. Very similar symptoms accompany shock from various causes, as internal hernia etc., none of which produce a change in the number of red cells.

If operation was performed for the relief of an inflammatory process this test would lose its value in part, as there would exist at the time of operating a leucocytosis. Saline infusions apparently increase the white cells at first.

The symptoms of a concealed hemorrhage are very much like those attending shock and if these symptoms alone were relied upon to make a diagnosis many errors would result. The pulse is increased in frequency in both and diminished in force equally in the two conditions. There is the sighing respiration in each, the features are pinched and surface bleached in the two, the skin is clammy in both, the patient is comfortable and indifferent in each, the pupils are dilated and respond slowly in either condition.

How is the diagnosis best made? Take for instance a fairly strong patient, remove an ovarian tumor from that patient occupying fifteen or twenty minutes in the operation, no adhesions, small pedicle, silk ligature, patient put to bed in good

condition at 9 a. m., pulse 80, temperature 98 degrees, no shock. Now visit this same patient at 3 p. m. same day and find her with pupils dilated, features pinched, free from pain, skin white as marble, lips shrunken and pale, pulse 160 and very compressible, cold, clammy perspiration, all symptoms of shock or hemorrhage.

Analyze the history of this case and experiencc will say that a patient leaving the table in the condition of this patient, having had no shock or anything done to produce shock, and I would diagnose an internal bleeding from a broken or slipped ligature and quickly dispel the doubt, if any existed, by cutting just one suture and introducing a tube or an artery forcep.

Take another case, extensive adhesions have been separated in enucleating a growth, the operation is a long one, the patient is more or less shocked at the completion of the operation, this condition continues until it assumes an alarming state and the question arises, is this a continuance of the shock, or is it in part or all due to the bleeding? If a tube had been introduced no doubt need exist, but in the absence of the tube there is nothing absolutely reliable to guide us but the cutting of a suture and opening a small portion of wound. This can be done with absolute safety.

On the other hand if this same patient left the table in good condition and a few hours later presented the shock-hemorrhage picture it would be quite safe to diagnose hemorrhage and act accordingly. As a rule the first evidences of shock begin during the operation and many cases of secondary shock in reality are cases of post-operative hemorrhage.

Each case is an individual one and the experience of the operator and his knowledge of what was done, how it was done and who did it, will lend much aid in determining the cause of the manifested symptoms, as well as the probable location of same, if from a bleeding surface or vessel.

If convinced that the patient is bleeding and that the loss of blood will prove fatal, the surgeon's only duty is plain and he should not shirk it, while giving strychnia, hot applications, etc. The patient is not safe until the bleeding is controlled;

I do not mean a slight oozing such as we often see in the tube of an adhesion case, but by hemorrhage a loss of blood that quickly shows its dangers by the rapid failure of the patient's vital forces.

It has been my misfortune to lose one operated case from a hemorrhage coming on a few hours after ligating a small pedicle with catgut. The abdomen was reopened, but the patient was dead or had ceased breathing when I began. The abdomen was full of blood. I have reopened the abdomen in two of my cases besides this fatal one. In both large quantities of blood were lost. In both recovery followed. In one case in the practice of another surgeon I reopened the abdomen, saving that case also.

Case I.—Male, aged 23. Interval operation for recurring appendicitis, very few adhesions, operation short duration—no shock, abdomen closed. Five hours later manifested evidence of loss of blood, by pulse, etc. (there being no reason for shock). Abdomen reopened and found full of blood, patient pulseless, found bleeding coming from a large branch of the deep epigastric artery. This was ligated at second operation, having escaped my notice during the operation and being in the lower angle of the incision retracted so that the closing suture missed it. Time of operation to stop bleeding, ten minutes; during this time the nurses introduced four pints of hot saline into bowel and after bleeding was controlled the median basilic vein was opened and five pints of normal saline solution introduced at a temperature of 112 degrees F. This brought a pulse of 140. He was placed in bed with head lowered and the other median basilic vein was opened and three pints more of saline was introduced. This gave him a pulse of 120 and of good volume.

An hour later four pints more were introduced into the rectum, thus making seven pints in veins and eight in colon. All of which was retained. He recovered.

Of interest in this case was the hemorrhage from a parietal vessel.

Case II.—Female, age 24. Large parovarian cyst, small pedicle transfixed with good strong Chinese twist, leaving a good "button." Not a single adhesion. Time of operation, twelve minutes. No shock, was conscious in twenty minutes after being placed in bed, pulse 76, temperature 98.5 degrees.

Six hours later I was hurriedly called, found her with evidence of dangerous hemorrhage. Recalling operation and its easy performance and the security of the ligature being almost assured, and knowing no reason why she should develop symptoms of a shock, I was confused somewhat to explain the source of symptoms, yet my intuition—if the surgeon has such—told me that it was a hemorrhage. I quickly cut one suture and introduced a sterilized hemostat into peritoneum. A gush of blood convinced me of the true condition. In four minutes the bleeding ovarian was securely retied and the abdomen closed in six more. The vessel had been cut by the ligature or broken below its constriction. All her blood was free in the peritoneum. Drainage tube introduced at secondary operation. Four pints of saline were introduced into right median basilic and two hours later four pints more flowed into the left. From having no pulse, she now had a good strong "satty" pulse of 120. Six quarts were introduced into the colon within a few hours. This patient made a good recovery.

Case III.—Female, age 23. Ovarian cyst removed by a colleague. Easy case, small pedicle, no adhesions, catgut ligature. Twenty-four hours later presented the usual symptoms of hemorrhage. Abdomen reopened and vessel secured with silk. Drainage tube used, saline used as in the other cases. Recovery.

The proper use of the normal saline solution in restoring patients in shock and from loss of blood is one of the most valuable additions to our work within the last few years. Its application is so simple and easy and its powers for good so large that I am surprised that it is not more extensively employed by the profession.

The introduction of air into the vein at time of infusing should be avoided, yet the danger from this source is not as great as is generally supposed. In one of my cases a faulty apparatus permitted a large amount of air to enter the vein. This was done by one of the nurses handling the bulb of apparatus in such a manner that it let in air, not a symptom was produced by this accident. I have in all my cases, save this one, used an ordinary fountain syringe and canula of an aspirating outfit or as in one case the glass nozzle of an ordinary medicine dropper. Everything about the apparatus should be

carefully sterilized; the salt should be baked and the water, when possible, filtered and always boiled. The height of the fountain will govern the pressure. Usually three feet pressure is all that is necessary.

The fluid must be kept at about a uniform temperature of 112 degrees in the bag. A lower temperature will frequently cause the patient to "chill."

I think it best to introduce the fluid in two sittings, where a large amount is necessary—about 90 gr, of common salt to a quart of water is approximately a "normal saline solution."

DEDUCTIONS.

I. In diagnosing post-operative hemorrhage the operative history will aid much.

II. Symptoms of shock and hemorrhage are very similar.

III. In suspected cases cutting a single stitch in incision will tell.

IV. In cases in which a bleeding is anticipated the tube should be used.

V. The surgery must be quick and decisive in these cases.

VI. Large quantities of normal saline solution will save many cases. This should be administered both per rectum and into the veins.

VII. Strychnia, belladonna, etc., will not control bleeding from a uterine or ovarian artery any better than from a radial or temporal.

VIII. The surgeon should do what his surgical conscience tells him is right.

DISCUSSION.

DR. H. O. WALKER, of Detroit, Michigan.—No one can appreciate more than an operator the death of a patient from hemorrhage following operation, particularly when we know that had the operation been properly done and the right material used, the patient would not have died. Dr. Cordier's patient died undoubtedly from the use of catgut. My method of preparing catgut is by dry heat. I expose the catgut for three hours to over 300 degrees, then repeat it the next day,

when the catgut is hard and not liable to break. I have had hemorrhages following the use of silk. I recall the case of a young man who had appendicitis for twelve days. He delayed operation until I found a suppurating appendix. I operated, and he did well until the fifth day, when secondary hemorrhage occurred, but it may be considered post-operative. The patient was fifty miles from where I live, and I was unable to reach him at the time except by telephone. In the vicinity of where the patient lived was a young physician who had previously been in my office. I instructed him by telephone what to do, and he succeeded in tiding the patient over until the next morning. By this time the patient was in a rather critical condition, but he improved. Later he had another hemorrhage. The father telephoned that the patient had had another attack of hemorrhage, and in twenty minutes he died. Where the hemorrhage came from during the second attack I do not know exactly, but I believe it must have come from some large vessel in the omentum.

A word or two in reference to the use of normal salt solution. It is a valuable adjunct in combating shock and loss of blood, and it should be used in all cases of prolonged and tedious operations, either by transfusion with trocar and canula or be given per rectum.

DR. EDWARD W. LEE, of St. Louis, Missouri.—I desire to refer to one point which I do not think has been mentioned either in the paper or the discussion, and that is, that hemorrhage is not so likely to occur if the patient has been in the Trendelenburg position. Of course, as long as the patient is in that position, gravity prevents to a great extent the hemorrhage which otherwise might occur. It is advisable, when a patient has been placed in the Trendelenburg position, before the abdomen is closed, that she should be placed in a horizontal position, and every point where hemorrhage can possibly take place should be scrutinized carefully, and I go so far as to tease around. After an operation is finished, I am not in a great hurry to close the abdominal cavity, but I take a little time, tease all around, examine the broad ligaments and stump, etc., where it would be possible for the hemorrhage to take place, with the patient in the horizontal position. The only case of post-operative intra-abdominal hemorrhage I have ever had that terminated fatally was where the patient had been in

the Trendelenburg position, and I was trying to break the record in fast operating. The patient was lowered, the abdomen sewed up rapidly, and six hours later the abdomen was found full of blood. Death ensued. Everything seemed all right when the patient was in the Trendelenburg position, but when she was lowered hemorrhage began to take place. This case illustrates the necessity of examining every point when the patient is in a horizontal position.

DR. CHAUNCEY D. PALMER, of Cincinnati, Ohio.—The last speaker referred to the importance of scrutinizing every point of ligation in the abdominal cavity, when a patient has been placed in the Trendelenburg position. It is an excellent idea. It is a good plan always, also, when we make an abdominal section, to force into the rectum a pint or quart of normal saline solution. I have witnessed Dr. Howard Kelly make many abdominal sections, and it is his practice to introduce a pint of normal salt solution into the rectum before patient is put into bed. It will not do any harm; usually is very serviceable.

There are two points which have come up in this discussion that are worthy of consideration. Post-operative hemorrhage occurs from some defect in the material used for ligation, or it is due to some faulty application of the ligature. Considerable stress has been laid upon catgut for ligature by Dr. Cordier, as not being appropriate for this procedure. I have used silk, and have had some trouble afterwards with it, and I think any one who uses it is more apt to have trouble with it than if he uses catgut. Silk undoubtedly will secure a vessel or vessels and prevent post-operative hemorrhage, but by infection it is apt to cause local irritation or some inflammation, and in weeks or months, or even years, afterwards, it may work its way through into the bladder, the vagina, or abdominal wall, and give rise to much trouble. Many women bother surgeons for months and years afterwards on account of irritation caused by silk ligatures. Catgut is equally secure. I am sure that quite a number, if not most, of the surgeons who make abdominal sections in or about Cincinnati use catgut. I have not used anything else for years inside of the peritoneal cavity. It never gives rise to any after-trouble, and it is found sufficiently well prepared to insure security for a sufficient length of time against post-operative hemorrhage.

As to the method of ligation of the pedicle, the late Mr. Lawson Tait used to use the Staffordshire knot; very good

sometimes, but now, I think, largely abandoned. It does not secure us against post-operative hemorrhage. It is apt to slip. Moreover, it strangulates too much tissue, and in that way oftentimes produces pain. Then, after the Staffordshire knot was abandoned more or less, we began to use the figure-of-eight ligature. This, too, strangulates a good deal of tissue, and is very apt to produce undue post-operative pain, and many patients were obliged to use some method or drug to allay that pain. I have, therefore, abandoned the Staffordshire knot and figure-of-eight ligature, although either is competent to arrest hemorrhage. I use a ligature as follows: For the removal of the Fallopian tubes or ovaries, or when I attack the ovarian artery for any cause, I place one ligature of catgut on the pelvic end of the broad ligament, outside the ovary and fimbriated end of the Fallopian tube, on the bony side of the pelvic wall; then I place another ligature an inch deep into the broad ligament, near the uterus, until it hugs it. The organs and tissues between the ligatures can now be cut out. In this way we can tie the ovarian artery on the side toward the pelvic wall, and we are sure of stopping the flow of blood into the broad ligament at the uterine side by the second ligature. If there should be a little oozing, all that is necessary to do is to stitch over the opened surfaces of the peritoneum with a fine catgut ligature.

Dr. Carl H. Andersen, of Chicago, Illinois.—I wish to congratulate the essayist on the excellent manner in which he has presented his paper, especially with reference to the use of the normal salt solution. I have had a great deal of experience with the saline solution and have done considerable experimental work along this line, and I believe this is the first time that I have heard of any one using the salt solution at the temperature which is correct, namely, 112 or thereabouts. Very few surgeons pay enough attention to the temperature of the solution as long as they have the normal blood heat. They do not take into consideration that a great deal of the heat is wasted as it passes down the long rubber tube—in fact, over half a degree for every foot of tubing. Nor do they take into consideration the fact that the normal salt solution gets cooler every minute, and that at the end of an operation for transfusion the last of the salt solution has lost from 8 to 15 degrees of temperature. And as the use of the salt solution is not alone for the sake of increase in the blood pressure, but with

the idea of increasing and stimulating the heart action and central nervous system, it can be readily seen that if the temperature of your salt solution is below 105, instead of decreasing the shock you increase it. A great many surgeons condemn the use of salt solutions because they do not know how to use it properly. Last year I devised an apparatus and presented it at a meeting of the Chicago Academy of Medicine, which by simple methods keeps the normal salt solution at the same temperature at the beginning of the transfusion to the end of it.

DR. JOHN L. JELKS, of Memphis, Tennessee.—I wish to say a few words in reference to some points that I did not clearly understand. If I understood the essayist rightly, he said he cut the sutures in the abdominal cavity that he sewed the abdomen up with. That is unnecessary if silkworm gut is used. Some use other ligatures and two layers, but where silkworm gut is used it may be untied just as quickly as almost any gut.

In reference to transfusion, I think the plan of the essayist is most excellent, but I cannot see what objection there would be to introducing water into the peritoneal cavity; it would be readily absorbed, and I have not seen any contraindications to its use. Furthermore, if necessary, the salt solution can be given per rectum or intravenously.

As to transfusion prior to the occurrence of hemorrhage, I can hardly believe that it is good practice, for the reason that the vessels are already overdistended from congestion due to traumatism, and it seems to me if we introduce a lot of salt solution it will overdistend the vessels in the peritoneal cavity and render the case more liable to hemorrhage.

DR. J. WESLEY BOVEE, of Washington, D. C.—I desire to offer one suggestion regarding the use of ligatures. I lost one case from post-operative hemorrhage following the removal of an ovarian tumor. Silk was used. In the last three years I have not used silk in the abdominal cavity. My method of ligating a vessel is not to attempt to do it by the ordinary ligature, but I suture the tissue, going deeply into it at right angles to the open mouth of the vessel, going down about half an inch or more into the tissue by a continuous catgut suture, tying it tightly. I go once or twice around the ligature. If you make

a continuous suture of it, draw it up and tie it, you can control any vessel that we ordinarily find in connection with abdominal operations.

As regards the use of normal salt solution in these cases, I agree with the gentlemen who have spoken, that we can fill the abdomen with salt solution as fast as we can throw it into the vein, and it gives just as good results, provided the case is not a septic one. If we have a virulent infection in the abdominal cavity, it is not wise to use salt solution. There is too much danger of scattering the infection. But in this way we can use a large quantity of salt solution. A larger quantity may be used in cases in which the abdominal wall has been distended by a tumor or tumors for which the operation is done.

The use of salt solution by the rectum is excellent. My way of using it is under the skin. If you take eight or twelve needles and inject the salt solution under the skin, it will prove just as efficacious as if injected intravenously. There is less danger of infection because you are not throwing the solution into the main centers of circulation, and the solution will be taken up just as rapidly, and you can inject it just as hot as you would dare to do in the vein. It could be used at a temperature of 115 or 120 degrees under the skin. If you can throw the salt solution in the abdominal cavity, of course you get it in the best place. One great danger is in injecting more of the salt solution than there has been volume of blood lost, the result being distention of the veins of the heart, overwhelming its normal reaction. This tends to paralyze it. If we can be sure of the amount of blood lost in a given case, and then inject that quantity or a little bit over, we will undoubtedly get rapid absorption and good action from it. I would emphasize the necessity of using the salt solution hot, say somewhere between 112 to 120 degrees.

DR. CORDIER (closing the discussion).—I wish to thank the members for their free discussion of my paper. In reference to what has been said concerning reopening a vein, I think there would be positive danger in doing that, and I would have more apprehension of a clot being carried by the action of the heart into one of the smaller vessels by using the same vein than I would if I had opened a vein in one arm, put on a dressing, and closed it up. It is better to open the vein in the other arm and make a similar dressing at the other place, instead of

cutting ligatures and opening up a wound several hours, old. I keep the temperature in a fountain syringe by using a milk thermometer encased in a wooden handle. If the temperature goes down we have a hot solution put in the syringe, and the thermometer is pushed in the fountain syringe so as to show the exact temperature of the solution.

The introduction of the solution into the peritoneal cavity would be an excellent method if we had a long time for the peritoneum to absorb it, but when we have a patient who has practically no pulse, and only a little effort at respiration, we have no time and nature cannot do the work. The peritoneum under such circumstances will not absorb the solution. Hence we must resort to some method that will replace the fluid in the veins quickly, because the heart has nothing to work upon. It is nature's last struggle. If you fill the vessel with the salt solution you give the heart something to work upon. It is remarkable to see how nature establishes the blood and how quickly the red blood corpuscles are reproduced.

I recall a case of extrauterine pregnancy in which there was a profuse hemorrhage. The physician, who called me in to operate, happened to have an antitoxin syringe, and I simply introduced the fluid under the tissues in different parts of the body, using hot water, mixing it with enough salt. In a case of that kind I would advise intracellular injection, for the reason that if it does no harm, it may only result in a local staphylococcus infection or other germ infection. The fluid will be absorbed. By filling the antitoxin syringe with an ounce of this saline solution at a time, forcing it into the tissues, I was enabled to force in different parts three or four pints of the solution. The water used was ordinary river water at about the temperature of the body. The patient recovered with a few small abscesses on the thighs and under the breasts.

V.—TREATMENT OF ADHERENT CYSTS OF THE OVARY AND BROAD LIGAMENT BY INCISION AND DRAINAGE. REPORT OF CASE

BY J. E. ALLABEN, M. D.

ROCKFORD, ILLINOIS.

One of the most frequent causes for invading the peritoneal cavity to-day is the removal of cysts of the ovary and broad ligament; and probably the most common and serious complication is the adhesion of these cysts to surrounding structures. The advent of aseptic surgery has rendered entrance to the abdominal cavity a comparatively harmless procedure, and as a result of this fact the study of the art of diagnosis has been greatly stimulated, so that tumors in this region are discovered much earlier than in former times, surgical procedures for their relief sooner undertaken, and, consequently, adhesions much less frequently form an obstructive element in their management.

Still, adhesions at the present time are sufficiently frequent to render a consideration of their management of much importance. The causes of death in cases of tumors with extensive adhesions are: Shock, sepsis and intestinal obstruction, and adhesion is one of the most potent factors in the causation of these conditions by prolonging the operation and by leaving raw surfaces behind after separation.

Adhesions about abdominal tumors are so extensive and so organized in some cases that removal is almost impossible. In other cases the entire procedure in an operation consists in the proper management of adhesions. A cystic tumor may become entirely separated from its original pedicle, yet its life and growth be maintained by the formation of new blood vessels in extensive adhesions. Such are the well-known parasitic tumors.

At first the columnar epithelium covering a cyst protects it from adhering, but as the cyst grows the epithelium is de-

stroyed and attachments readily form between the cyst and surrounding tissues. These adhesions, which at first are loose, soon become more and more organized, until it is almost impossible to separate them, and in attempting to do so the bladder, intestines, ureter or large blood vessels may be injured. The extent of adhesion cannot be determined in any particular case until the abdomen is opened, and next to the *size* of the tumor the extent of adhesions is the most important consideration in the prognosis; in small and medium-sized tumors it is the *most* important consideration.

Where adhesions are of recent formation they may be readily stripped off with the fingers; in some cases where they are more organized a differentiation may be effected with the fingers between the cyst and the involved organ and the tough bands severed with scissors or scalpel. In other cases the adhesions have caused so perfect an amalgamation that differentiation is impossible. In such cases a portion of the outer cyst wall may be left attached to the involved organ and the remaining portion of the cyst removed, as illustrated in a case of Dr. Howard Kelly,* where a portion of the cyst was left behind as large as a nightcap.

Lastly, there are cases where the walls of the cyst are so perfectly incorporated with the adjacent peritoneum and so adherent to various organs that none of these methods are consistent with a probable maintenance of life, and the idea of removing the cyst must be abandoned and some other method of treatment pursued.

This condition of things and a successful way of dealing with it is illustrated in the following case:

Mrs. S. E. B., age 31, consulted me December 4, 1899. Her father died of cancer of the face at 55; mother living, aged 61. Has had eight brothers and five sisters whose history has no special bearing on this case.

The patient menstruated at 12 or 13 naturally and continued regular until 15 years old, since which time she has not enjoyed good health. At this age, while carrying a tub of water, she fell, striking the abdomen on the edge of the tub,

*Operative Gynecology—Kelly, Vol. 2, p. 298

which caused a two weeks' sickness. She thinks her trouble dates from this accident. Since the accident menstruation has been irregular and painful. Was married at 18; a year later had a miscarriage and was sick for two weeks. Her only child was born a year from this date, labor being normal. Has had more or less womb trouble. Three years ago had bladder trouble which was not accompanied with a yellow vaginal discharge. About this time she was curetted by a physician at her home, without improvement. She has a fair appetite, is constipated, sometimes menstruates every six weeks, sometimes twice a month, with pain and increased flow. Has pain in the lower part of abdomen most of the time; sometimes the pain is very sharp. The bladder is very irritable and sleep is disturbed. For six months she had noticed that the abdomen was enlarging. She seeks relief from pain. Physical examination: The lower part of the abdomen bulges forward, as in pregnancy of five or six months, but most prominent on the left side. The tumor is dull on percussion, elastic and painful to pressure. Vaginal examination reveals the uterus crowded up against the pelvic bones and toward the right. The pelvis is filled with an elastic tumor. Pressure through the vagina produces pain. The tubes and ovaries cannot be palpated. The uterus is so misplaced that the cervix cannot be inspected through an ordinary speculum. A probe enters the uterus to the depth of three inches.

Diagnosis: Adherent ovarian or parovarian cyst of left side. Operation December 11, 1899, at St. Anthony's Hospital. The abdomen was opened in the median line, revealing a characteristic parovarian cyst about the size of a man's head. The cyst was punctured with an ovarian trocar and about two quarts of straw-colored fluid drawn off. The opening in the cyst was enlarged and about as much more fluid was poured out by turning the patient upon the side and by mopping out with gauze sponges. There were extensive organized adhesions of the cyst wall to numerous coils of the ileum, to the vertebral peritoneum, the rectum and to the floor and left side of the pelvis. An attempt was made to peel off the outer coat of the cyst from the intestines, resulting in making a rent into one of the coils, which was closed with a double row of running Lembert suture of fine silk. Considerable time was spent in an effort to enucleate the cyst, but the cyst walls were so adherent to the broad ligament and the surrounding peritoneal surfaces that further efforts at enucleation were abandoned. The cyst was then drawn out as far as possible into the abdom-

inal wound and stitched to the peritoneum in the lower angle so as to completely shut out the peritoneal cavity from the cyst cavity. The abdominal wound was closed to within two inches of the lower angle, a rubber drainage tube having first been passed through the bottom of the cyst and out of the vagina. A few strips of gauze were passed to the bottom of the cyst and allowed to protrude through the abdominal wound.

Save for a rather rapid pulse for the first three or four days, convalescence was uneventful. After the third day the dressings were changed daily, fresh gauze being carried into the cyst each time. The cyst walls collapsed and the cavity filled rapidly by granulation. Five weeks after the operation she left the hospital with a sinus about four inches deep and about the size of a uterine probe. This closed completely February 5, eight weeks from the date of operation.

After the operation the patient's health improved very much; she was free from pain and other unpleasant symptoms for four months, when she began to suffer pain on the opposite side and vaginal examination revealed a tumor of the right ovary. A second celiotomy was performed six months after the first operation through an incision two inches to the right of the old cicatrix and a mutilocular ovarian cyst about the size of two fists was removed without difficulty.

After completing this operation I made an examination of the site of the first tumor, but there was nothing present to indicate the existence of a former cyst. The matting of the intestines had entirely disappeared and even the cyst walls had been entirely absorbed, leaving the parietal peritoneum free and smooth at the point where the cyst walls had been drawn out of the abdominal wound. Recovery from the second operation was smooth and the patient has enjoyed good health since, with restoration of normal menstrual function.

In this management of adherent cysts the peritoneal cavity is completely shut out from the cyst and the outside world and the suppurative process in the cyst walls is a conservative element.

Parovarian cysts are composed of an outer fibrous wall lined with ciliated epithelium or flattened non-ciliated epithelium.

Cystic adenoma, the historical ovarian tumor, consists of a fibrous stroma in which are tubular follicles lined with ciliated epithelium, or in some cases there are papillary outgrowths from the stroma covered with ciliated epithelium. The ad-

mission of pyogenic germs through the medium of air to the lining membrane induces a suppuration and destroys the secreting epithelial cells, and in their stead is implanted a granulating surface. The walls collapse against each other and the cyst cavity is obliterated through the various processes of healing by second intention, viz.: granulation, fibrinization, and ultimately connective or cicatricial tissue formation.

The processes by which adhesions are formed about tumors in the peritoneal cavity are such as obtain in ordinary active inflammation caused by mechanical irritation, viz.: escape of leucocytes through injured veins and capillaries and proliferation of connective tissue cells. The character of the exudate —serous, fibrinous, suppurative, etc.—depends upon the degree of irritation caused by pressure and upon the absence or presence of bacteria. Adhesions of a tumor to contiguous tissues and viscera continues so long as pressure irritation continues; but if by any method of treatment the exciting cause is removed, processes directly opposite to those causing adhesions are at once set in action by nature, and instead of building up there occurs a tearing down of the adhesions through the processes of liquefaction and absorption of exudates.

The extent to which this can be carried is illustrated in the case above recited and is also demonstrated by operative work in the peritoneal cavity of animals.

For example, if we resect a portion of intestine of a dog and examine the tissues a week later, we may find extensive matting of the intestines and omentum to each other and to the parietal peritoneum; but an examination of the same tissues several months later usually reveals a complete clearing away of the adhesions induced by our manipulations. In the treatment of adherent cysts of the ovary and broad ligament it would seem, therefore, that our efforts to release adhesions and remove cysts have been prosecuted to an extent unjustifiable and unnecessary in many cases.

By incising, emptying and draining the cyst cavity we remove the cause exciting adhesions and induce conditions that ultimately work a permanent cure and at the same time do not expose the patient to conditions prejudicial to life.

This treatment of cystic tumors is applicable to most other abdominal cysts, such as cysts of the pancreas, and is merely applying the principle we adopt when we stitch the gall bladder to the peritoneum and drain it for empyema or hydrops of this organ, and if it were practiced more frequently in the treatment of adherent cysts of the ovary and broad ligament some lives might be saved which now succumb to shock, sepsis or ileus due to prolonged effort to release adhesions.

VI.—VENTRAL HERNIA FOLLOWING LAPAROTOMY.

BY B. BRINDLEY EADS, M. D.

CHICAGO, ILL.

The occurrence of ventral hernia as a sequence of abdominal section is so common that it should command our thoughtful consideration. The variety of incisions recommended for the same operation shows that surgeons are by no means agreed as to the most trustworthy method. It is not my purpose to review the whole subject of parietal incisions, but rather to urge the adoption of those methods which personal experience has demonstrated to be of the greatest utility, both immediate and remote. Medical literature teems with descriptions of complex methods of closing the abdominal wound, but little has been said regarding the best way of making it. A few years ago only the physiology of the abdominal wall was considered, but now we look to anatomy for guidance in making the incision as our only security against physiological impairment and the subsequent development of ventral hernia.

I believe that fifteen per cent. of all patients upon whom laparotomy has been performed, if examined five years or more thereafter, will be found to be suffering from post-operative hernia. I am convinced that this percentage is too low, yet it is sufficiently high to make the subject one of vital importance to every physician and surgeon. Some modern surgeons do not care to make this admission, which partially accounts for

the lack of figures from which to prove this assertion. On the other hand, he cannot estimate with even approximate correctness the number of cases of hernia that have followed his own operations, because many patients will, under such circumstances, apply to other operators.

During the last two years I have operated on eight cases of ventral hernia following abdominal section, only two of which occurred after operations which I had performed.

We no longer dread the almost inevitable and fatal peritonitis of pre-antiseptic days; we open the abdomen, not only for disease but with diagnostic intent, and we believe that the mere opening of the abdomen has an only infinitesimal influence on the mortality. We must admit, however, from our own experience and the accumulated experience of operators, that ventral hernia is a frequent complication which renders the lives of the patients miserable and often entirely useless, so that they merely exist in contemplation of second operations the ultimate results of which are more or less disappointing since relapses, as Coley has pointed out, take place in more than one-half of the cases.

Anatomy.—On examination of the abdomen we are at once reminded of the striking difference between it and other great visceral cavities, owing to the lack of bone in its walls. The outline of the anterior wall constitutes an oval whose long axis is vertical and protected superiorly at the sides and back by the false ribs. Posteriorly it is divided into two symmetrical halves by the lumbar portion of the spinal column whose transverse processes afford strong points for the attachment of muscles which occupy the otherwise unprotected space between the ribs and the iliac crests. Superiorly, the broad expansions of the ilia, completed behind by the promontory of the sacrum, support a portion of the abdominal viscera. The remainder of the support is afforded by the parts which enter into the composition of the abdominal parietes. The abdominal wall presents a hexagonal shaped figure bounded above and laterally by the costal cartilages of the six lower ribs, behind by the transverse processes of the lumbar vertebræ and

below by the iliac and pubic crests united by Poupart's ligament. This is the accessible area, the locality in which incisions are made through contractile walls always active, and maintaining such a uniform degree of pressure on the contained organs that displacements and alterations of position are of rare occurrence excepting when they occur through some preternatural opening.

The different layers are entitled to consideration.

The skin is a common habitat for pyogenic organisms. This should be remembered, and the most painstaking care exercised in the disinfection of the field of operation. The growth and activity of these organisms is greatest where the hair is most abundant and the sweat-glands are most numerous, as around the umbilicus, the mons veneris, and, in very corpulent persons, the deep transverse grooves, one of which crosses and conceals the navel, while the other is located immediately above the fat of the pubes.

The superficial fascia consists of two layers; the outer, in many individuals, attains a considerable thickness, especially in the lower abdomen, the situation of the classical incision for operations on the uterus and its appendages, the bladder and the appendix vermiformis.

The rule is to provide plenty of room by making a long skin incision and carrying it through both layers of the superficial fascia, thus enabling the operator to deal with the essential elements, the muscles, aponeuroses and nerves. A long skin incision does not influence the mortality nor does it increase the liability to hernia.

Muscles and aponeuroses. The great strength of the abdominal parietes is due to the thickness and the arrangement of the muscular lamellæ and their aponeurotic expansions. In the anterior and lateral walls we find on each side five muscles, of which three are vertical, two in front—the rectus and pyramidalis—and one posterior—the quadratus lumborum; while between these two vertical planes there is a quadrilateral space filled in by three muscular layers—the external oblique, internal oblique and transversalis, whose fibers cross one an-

other in a more or less oblique direction. This arrangement of the muscular fibers serves to keep the organs in their normal position with reference to each other, and the contraction of these fibers causes approximation of the muscular elements and movable bony boundaries, thus offering the greatest degree of opposition to the demands of intra-abdominal pressure.

The fleshy fibers of the external oblique descend with varying obliquity, the upper fibers terminating in aponeuroses opposite a curved line which extends outward from the prominence of the ninth costal cartilage to the front of the iliac crest, while the lower fibers pass almost vertically from the lower ribs to the anterior part of the crest of the ilium. The aponeurosis or tendinous expansion of this muscle attains considerable thickness toward the lower part of the abdomen, where great strength is requisite to sustain the viscera.

The fleshy fibers of the internal oblique also diverge, the upper fibers extending obliquely inward and terminating opposite the outer border of the rectus, where they become aponeurotic and ensheath the upper three-fourths of that muscle. The two layers unite in the middle line and blend with the fibers of the aponeurosis of the corresponding muscles of the opposite side.

The fleshy fibers of the transversalis end above and below, nearer the outer border of the rectus than do the central fibers of the muscle, which are more or less scattering. From a practical standpoint they may be regarded as a portion of the internal oblique and may also serve as a useful guide to avoid the division of the abdominal intercostal nerves.

The rectus muscle arises from the crest of the os pubis and is enclosed by the aponeurosis of the lateral abdominal muscles for its upper three-fourths. In its lower fourth the aponeurosis passes in front, while the transversalis fascia alone separates it posteriorly from the subperitoneal areolar tissue and peritoneum. As it ascends to the chest it leaves a space of increasing width where the component fibers of the aponeuroses blend to form the strong tendinous band called the linea alba.

The external border is convex to compensate for the lack of muscular substance between its outer border and the mesially concave lateral muscles. This insufficiency is due to the separation of the tendinous expansion of the internal oblique to enclose the rectus, and is known as the linea semilunaris.

The transversalis fascia is a dense aponeurotic membrane, thicker below than above to compensate for a deficiency of muscular and tendinous supports. This condensed tissue forms the posterior sheath of the rectus along its lower fourth, where strength is especially required. It is always a useful guide in opening the abdomen, as beneath it rests the extra-peritoneal tissue, which is the only structure that separates it from the parietal peritoneum, a membrane best identified by noting the separate layers that have been cut through. If this practice be adopted, adherent peritoneum need not confuse the operator.

Nerves.—The abdominal muscles, either whole or in part, are helpless and therefore useless without their nerve supply. One cannot reflect on the structure of the abdominal wall without admiring the great precision with which the nerves are supplied to these muscles. They are supplied with branches running in the connective tissue which binds together the bundles of muscular fibers and these finally end so that every muscle fiber is supplied with one or more nerve fibers.

The anterior continuation of the abdominal intercostal nerves takes its course from the anterior end of the intercostal spaces between the internal oblique and transversalis muscles to the sheath of the rectus, which they perforate, and after supplying that muscle, terminate in cutaneous branches near the linea alba. These nerves end independently and do not anastomose with the nerves of the opposite side nor, in all probability, with the nerves of the same side.

The nerve supply of the abdominal muscles is derived from the seventh to the twelfth intercostal inclusive, together with the ilio-inguinal and ilio-hypogastric.

For surgical purposes I wish to separate these nerves into three distinct groups, according to their course and the areas

of the abdominal parietes supplied by them. The seventh and eighth pursue an obliquely ascending transverse course and are distributed to the upper third of the abdominal wall. The ninth and tenth pass transversely inward to the middle third of the abdomen. The eleventh and twelfth intercostals, ilio-hypogastric and ilio-inguinal nerves descend in an obliquely transverse direction to supply the lower third of the abdomen.

If the nerve be severed, that portion of the muscle distal to the seat of division is deprived of its power of contractility, its blood supply is diminished, it wastes, weakens, and, in response to the demand of intra-abdominal pressure, all the overlying structures will stretch and hernia will inevitably result. Close suturing and accurate apposition of like structures will not prevent it; the recumbent position for a longer period of time than the customary three weeks does not lessen the liability, nor is any external appliance effective.

Intact innervated muscular fiber is the only safeguard against hernia.

In view of these facts, therefore, confirmed by clinical experience, the first rule should be to make the abdominal incision parallel or nearly parallel with the direction of the motor nerves and of the most important muscular fibers supplied by these nerves.

In the consideration of the incision the following important points must be taken up:

1. The length is largely dependent upon the thickness of the superficial fascia; it must be sufficient to allow free access to the muscles whose functional integrity is essential to success.

2. The length must be relatively greater when muscular fibers are to be separated instead of divided.

3. It must vary with the pathological condition for which the operation is performed.

4. An opening of sufficient size must be secured for thorough exploration and to obtain the requisite degree of precision and rapidity in manipulation.

5. A long incision through the skin and superficial facia does not predispose to hernia.

6. It lessens the mortality by providing ample space for the protection of surrounding viscera.

7. It lessens shock by diminishing the time required for the operation, and also the duration of the anesthesia.

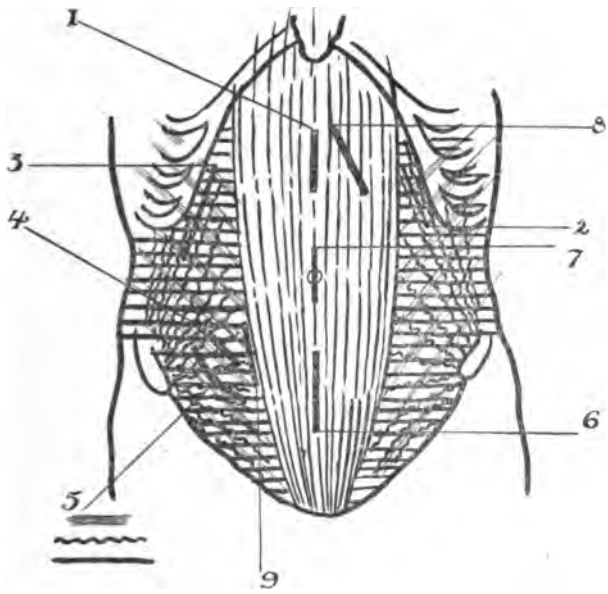
Therefore the rule should be: Let the incision be long enough to provide every facility for thorough work through muscular fibers and nerves which have been separated rather than divided.

Guided by the principles above enunciated, I will now consider the subject of the incisions which I have found most useful.

Incision No. 1.—Begins about two fingers' breadth below the xiphoid appendix, gives ready access to the stomach, and through it most of the operations on this viscus may be done. The distance from the bony margins is sufficient to permit ample mobility to meet the requirements of a movable stomach, a feature well marked under conditions which demand operation. Provision of operating space is one of the leading requisites, and in order to secure this it may be necessary to incise one or both of the recti muscles transversely. This will gives the freest possible access in pylorectomy with the minimum injury to the motor nerves. The additional transverse scar which is not unlike the linea transversa in structure, does not interfere with the contracture of the muscle. The vertical incision over the rectus with separation of the muscular fibers, which has been recommended so highly, is a failure, but is not so disastrous in its results as is a vertical incision along the outer border of the rectus; in the former, that portion of the muscle external to the line of separation is deprived of its motor nerve supply; in the latter we deliberately cut off the motor supply of that portion of the muscle which corresponds to the area of distribution of the divided nerve.

Incision No. 2.—Is made to the left of the rectus muscle parallel to and a little below the costal arch. It is directly opposite the stomach and gives access to the vicinity of the car-

diac orifice in the operation of gastrostomy. The incision corresponds with the direction of the fibers of the internal oblique and permits separation of these fibers in their normal oblique arrangement together with their motor nerves, thus providing a muscular sphincteric action around the base of the diverticulum of the stomach or the future esophagus, thereby prevent-



Author's diagram of the abdominal wall to show the direction of the essential muscular fibres and the location of the principal incisions.

External oblique muscle, (oblique lines); internal oblique muscle, (zigzag lines); transversalis muscle, (transverse lines.)

1. Incision for gastrostomy, gastro-enterostomy, pylorectomy. 2. Gastrostomy. 3. Cholecystatomy and other operations on gall, bladder and gall ducts. 4. McBurney incision. 5. Author's incision for operation on the appendix vermiformis. 6. Incision for operations on uterus and appendages. 7. Incision for exploration of the peritoneal cavity. 8. Incision obliquely, downward and outward over rectus with vertical separation of its fibres, the usual incision for gastrostomy. 9. Another incision for operations on the vermiform appendix and cecum.

ing the escape of food. Howse and others recommend that the parietal incision pass vertically through the fibers of the rectus muscle in order to obtain a sphincter-like action. (Incision No. 8.) From what has been said before it is readily seen that such a vertical incision through the muscle must divide the terminal branches of the intercostal nerve and that consequently the portion of the muscle distal to the divided

nerve must undergo paralysis and cannot enter into the sphincteric action desired, a provision more desirable than the liability of ventral weakening. The much employed vertical incision in the line of the linea semilunaris has nothing to recommend, but much to condemn it.

Incision No. 3 is from four to six inches in length and is three fingers' breadth below the costal margin, the center of which corresponds to the apex of the tenth costal cartilage. This incision permits the separation of the fibers of the internal oblique together with the upper abdominal intercostal nerves, both of which can be separated after division of the external oblique, thereby giving easy access to the gall-bladder. The exigencies of operations in this region at times demand a large opening for inspection of deep underlying structures and under these conditions it may be necessary to make a vertical incision aong the linea semilunaris.

Incision No. 4, as recommended by McBurney, is deservedly popular, owing to the care it takes in avoiding muscular fibers and their contained motor nerves, and consequently the prevention of post-operative hernia. Most surgeons agree that fewer cases of hernia follow operations in which this division is made than any other operation on the appendix. Originally this incision was intended for non-suppurative cases in which drainage was not required, but the success which has followed the application of the principles involved in making it, has caused its almost universal employment in appendicitis, including those cases with abcess formation and those in which drainage is required. The method is almost ideal in the class of cases for which it was recommended by the originator, and those who have attempted to adopt it in every case should not argue against its usefulness.

Incision No. 5.—The difficulties I experienced in reaching the appendix through the McBurney incision in acute suppurative cases caused me to devise another method of approach in a more dependent part. This incision overlies the outer border of the cecum and leads directly to the appendix. It is slightly curved outward and downward, crossing an imag-

inary line drawn between the anterior superior iliac spines. The center of this curve is from an inch to an inch and a half to the inner side of the right superior iliac spine. The skin and superficial fascia are incised for about two inches. This freely exposes the aponeurosis of the external oblique, which is separated by means of the dry dissector, or the handle of a scalpel, in a direction parallel to its fibers, and well retracted. This brings into view the transversely arranged fibers of the internal oblique and transversalis muscles and the twelfth abdominal, ilio-hypogastric, and possibly the ilio-inguinal nerves, which are in turn retracted in order to reach the transversalis fascia, which, together with the peritoneum, is divided transversely. The advantages to be gained by this incision are:

1. It provides easy access to the diseased area.

2. It enables the operator accurately and securely to protect the peritoneal cavity from infection.

3. It lessens the liability of breaking down the inner limiting wall of adhesions.

4. It affords a better opportunity to open the abscess cavity from the outer side.

5. It favors drainage.

6. It has not been followed in the author's experience either by appendicular fistula or post-operative hernia.

The urgent necessities of the case may require division of the muscular fibers, but the experienced operator, conscious of his ability to deal with whatever he may find within, will seek to establish, step by step, a living innervated muscular barrier against ventral hernia, the most important sequel to surgery of the appendix.

Want of space embarrasses the operator and should not be tolerated, because at any time during the progress of the operation he can enlarge the opening along anatomical lines to a sufficient extent to approach accurately any abscess cavity in the iliac fossa, or to make any other manipulation that may be required in the exposure and removal of the appendix.

Incision No. 9.—Incision in the linea semilunaris tends to draw the wound apart by reason of muscular action on the

outer side and inaction due to paralysis of a portion of the rectus, on the inner side. Incision through the fibers of the rectus is not quite so unfavorable in its results as regards hernia, yet it divides the motor nerve. It is applicable only in non-suppurative cases, as it cramps the opening, and as enlargement by incision or separation in either direction leads away from the seat of the disease.

Incision in the median line offers no advantages and should be abandoned except in cases of ruptured abscess and diffusion of pus in the free peritoneal cavity, and then washing can be best carried out and drainage established.

Incision No. 6 divides the united aponeurosis of the rectus muscle together with one or both of its sheaths, owing to the practical absence of linea alba below the umbilicus. This is a fortunate provision, inasmuch as hernia would take place more often were it not that the parallel muscular fibers are directly involved in the healing process, thereby adding strength to a situation where all the resistance possible must be offered against intra-abdominal pressure.

This incision is employed more often than any other and I wish to insist on a strictly accurate median incision avoiding the separation of muscular fibers and nerves. A shorter incision through fascia enables the surgeon to carry out both exploration and treatment to the best advantage, and yet favors him with parallel muscular fibers to facilitate approximation.

Incision No. 7 is recommended by Kelly through the umbilical ring where the abdominal wall is thinnest from absence of fat and muscular tissue between the skin and peritoneum. In the very corpulent it lessens the danger of suppuration during convalescence and of hernia thereafter. Should it be carried above the umbilicus care should be taken to incline it toward the left in order to avoid the suspensory ligament of the liver.

Appropriate to the subject and in keeping with the principles enunciated, I wish to consider briefly the treatment of ventral hernia. From the foregoing you will observe that I regard this condition as a stretching not only of the scar tissue

but of all the tissues of the abdominal wall at the site of its occurrence. If in the median line the covering of the hernia is stretched cicatrix, stretched skin, superficial fascia, aponeurosis and peritoneum, together with more or less separation of the recti muscles. If it occurs in the extra-median portion of the parietes the coverings are stretched cicatrix together with all the other tissues in the vicinity of the scar.

Ventral hernia takes place through tissues deficient in or devoid of innervation. Restoration by substituting another cicatrix through fascial tissues is useless. To remedy this breach it is necessary to excise the redundant and atrophic tissues, bringing into the wound area as much muscular fiber as possible. It is not always necessary to enter the peritoneal cavity.

Analysis of the histological structure of the cicatrix shows that it is made up of fibrous tissue throughout its depth, therefore we should make every effort to increase the bond of union by bringing into the wound area as much tissue as possible for approximation. This can be better done by the use of a modified mass suture which in no way interferes with the accurate apposition of like structures.

In closing the abdominal wound I first unite the peritoneum by a continuous catgut suture, employing a well-curved, stout Hagedorn needle, armed with silkworm gut. The needle enters the skin about a quarter of an inch from the edge of the incision, passes into and through the superficial fascia, including muscular tissue and associated fibrous structures, and picking up the peritoneum, enters near the border, but not perforating it. The needle is again introduced on the opposite side, passing through the structures in reversed order. After all the sutures are in place and hemostasis accomplished, the wound is raised by means of the sutures by an assistant, while the operator removes the protecting gauze and ties the sutures.

DISCUSSION

DR. H. O. WALKER, of Detroit, Mich.—The subject of hernia following operation is one which has given operators a

great deal of concern as to their results in closing the abdominal wound. The anatomical points the essayist has given us in connection with the closure of these wounds have not been sufficiently emphasized in the past, and I agree with him that the division of nerves must of necessity result in more or less atrophy, etc., favoring the development of ventral hernia. The different incisions he mentioned are the best that can be made for dealing with those structures that we have to operate upon, as the appendix, the gall bladder, etc.

As far as closing the abdominal incision is concerned, it is an important item, but I question whether suturing by layers is of any particular benefit or advantage. I am not in the habit of closing them in that manner only, except in certain cases. I have done it in the past, following the line of work that other men have planned, yet I can see no advantage in doing it. I use the *en masse* suture, beginning as the essayist does, but I do not, as a rule, sew up the peritoneum first. I insert the Hagedorn needle, closing *en masse* with the silkworm suture, commencing in close proximity to the edge of the wound, curving and catching up the muscle and fascia and passing the needle through the peritoneum underneath, at the same time crossing it, then catching the peritoneum on its edge from the other side, in this way securing perfect closure of the incision.

DR. EDWARD W. LEE, of St. Louis, Mo.—There is one point I want to emphasize, and it is with reference to the suggestion made by Dr. Walker of sewing the peritoneum entirely first, then the fascia, the muscles and the integument. I think a great deal of pain can be prevented by sewing up the peritoneum alone, then sewing the other structures after that. When the peritoneum is sewed separately, patients do not suffer as much pain as they do when the whole incision is sewn up *en masse*. In the event of tympanites, or of anything that is liable to distend the abdomen, the peritoneum suffers more if it is involved in the general suture than it does if it is sewed up separately. I would not use any other method.

DR. HAROLD N. MOYER, of Chicago, Ill.—I would like to ask Dr. Eads if severing of the nerve would cause paralysis which would eventually lead to ventral hernia, and if these herniæ are of late or early appearance after the closure of wounds? Again, do the nerve fibers ever cross transversely to the long axis of the fibers of the muscle after the nerve enters the muscular sheath, and if they would ever be severed by blunt dissection?

DR. J. WESLEY BOVEE, of Washington, D. C.—I am very much in accord with all that has been said regarding this line of work, but as the tier suture has been assailed, I desire to say a word or two in its defense. I close the abdominal wound with tier suture, and until I have some further evidence of the advantages of the through and through suture, which I have discarded to adopt the tier suture, I shall not go back to it. I close the peritoneal wound below the umbilicus with a purse-string suture, doing it with a fine continuous catgut suture, just webbing over the edge of it, being careful usually to not pick up the aponeurosis of the recti muscles with it. This prevents adhesions of the omentum on the inner side of the incision. There is only one way adhesions can occur. The essential point in closing the abdominal incision to prevent ventral hernia is to get the aponeurosis below the muscle accurately coaptated, as well as the fascia above the muscle. I am just as particular, perhaps more so, in closing the fascia below the muscles with a continuous row of catgut as I am to close any of the rest of the wound; bring the fascia together; in that way you prevent the first indentation in the formation of ventral hernia. If the wall is thick, I add another row of sutures in the fascia between the two recti muscles. I occasionally dip the needle down into the tissues that have already been sutured, and come up through the fascia in that way. As a protection against future infection or trouble with the wound in healing, which oftentimes leads to hernia, I close the fat with one or two, perhaps three, layers of fine catgut, and then finish by closing the skin with a superficial suture of catgut, leaving none of it on the outside. By this method of suturing my results have been very good indeed. I have not seen a hernia following an abdominal wound closed in that manner. We have the advantage of a better wound after the operation. We put bichloride gauze over the wound and over the whole collodion dressing. We need no bandage over the abdomen. The collodion dressing may be taken off in from one to two weeks, at which time the wound will be found clean and smooth.

DR. EADS, closing the discussion.—With reference to the question asked by Dr. Moyer, by referring to the cut you will notice that the abdominal nerves are separate from one another. You will also notice that they are separated from one another in their trunks and to a large extent in the area of

distribution of the nerve to the rectus muscle. There is no anastomosis or crossing over, or intermingling of nerve fibers in the median line, which is a fortunate provision against ventral weakening following an incision in the median line. We have no nerves to protect or destroy, and the cicatrix is strengthened upon either side by functionally active muscles.

A blunt dissection, that is, vertical separation in the extra-median portion of the abdomen will undoubtedly add injury, if not division of the motor nerve supplying that particular area. Therefore, the oblique incision, which McBurney has recommended, and which has been so popular ever since, is the best argument in favor of oblique incisions following out the direction of the muscular fibers and the motor nerve contained therein.

With reference to the remarks made by the gentleman who just preceded me, about closing the abdominal wound, we must remember that all the tisue which unites the wound is of the same variety, fibrous tissue. The greater the amount of approximated wound surface you bring into contact, the greater will be the depth and strength of the union. It is unnecessary to accurately appose all like structures to get strength of union. Again, when we appose like structures and resort to very much manipulation in the interior or along the wound edges, we encourage more or less oozing of blood and effusion of serum, which in itself is sufficient to separate the walls of the wound. Again, in tier suturing we get spaces or intervals between layer after layer in which an accumulation of blood and serum can take place, thus delaying the reparative process and inviting infection by providing an excellent culture media.

VII.—THE RELATION BETWEEN APPENDICITIS AND GALL-STONES.

BY A. J. OCHSNER, M. D.

CHICAGO, ILL.

That it is frequently difficult to make a differential diagnosis between gallstones and appendicitis has been pointed out by many of the most experienced authors—Deaver, Fowler, Mynter, Murphy, Lennander, Kehr, and others. A few surgeans—Maurice Richardson, Sonnenburg and Kölliker—have reported cases in which both conditions existed in the same patient, but, so far as my study of both subjects has extended, I have been unable to find any author who has considered a relation between the two conditions.

During the past few years I have operated upon a number of patients suffering from acute or chronic appendicitis, in whom I discovered, incidentally, stones in the gallbladder, and vice versa I have operated upon patients for the relief of gallstones and have found this condition complicated with chronic appendicitis. In these cases the appendix was usually extensively adherent; the cecal end was partly or wholly obliterated; the distal end was club-shaped and contained septic material in the form of fecal concretions, pus or mucus. The frequency with which these two conditions coexisted in the same patient seemed to indicate some relation between these two pathologic conditions. As a result of these observations I began on February 1, 1900, to examine the appendix in all patients upon whom I operated for the relief of gallstones, and I have arranged a table of all the gallstone patients upon whom I operated at the Augustana Hospital during the four months of February, March, April and May of the present year. I have also added the histories of all cases in whom both gallstones and appendicitis were present. I had intended to include a longer period of time, but find that this would carry me beyond the limits of this paper. Moreover, I believe that the

number of cases tabulated is sufficient to warrant my conclusions.

During these four months I operated upon eighteen patients suffering from gallstones, and of these six, or one-third of the entire number, suffered at the same time from appendicitis. In each one the extensive adhesions, or the cicatricial contractions, showed that the patient must have suffered from a violent, acute attack of appendicitis at some time, and in each case the appendix contained septic material in the form of fecal concretions or pus. It seems clear, then, that during the acute attack an infection of the gallbladder with the colon-bacillus could have been easily accomplished, and this also would have been possible during the long-continued chronic appendicitis following.

Cushing and others have pointed out the fact that a considerable proportion of all patients suffering from gallstones have previously had typhoid fever. Mignot and others have shown experimentally that the colon-bacillus is capable of causing the formation of gallstones. Gilbert and Fournier seem to have proved beyond a doubt that micro-organisms actually are the exciting cause in the formation of gallstones.

These facts are borne out by many other observers, both in the field of experimental and clinical surgery, so that there can scarcely be any doubt concerning the correctness of the theory that infection is the essential cause in the formation of gallstones, although there are undoubtedly many predisposing cases, such as faulty diet, constipation, tight lacing, sedentary habits, etc. It is plain that infection can readily occur either through the lymphatics or through the venous system; or, during the acute attack of appendicitis, when the entire alimentary tract, above the ileocecal valve, is filled with infectious material, infection through the common duct is quite possible.

The experiments of Nasse have shown that the contents of the gallbladder become septic upon closure of the common duct; direct infection is not at all necessary.

With one exception, all of these patients suffered from the acute attack of appendicitis at a time when a diagnosis of this

disease was rarely made, hence the histories fail to bring out the fact that the patient has suffered from appendicitis, notwithstanding the pathologic conditions found at the time of operation demonstrate this fact beyond a doubt. It is to be expected that in the future this will be different because at the present time all competent physicians recognize this disease. I will say that in but one of these cases a positive diagnosis of gallstones complicated with appendicitis was made, although I have come to suspect the presence of chronic appendicitis in cases suffering from gallstones, and consequently always make a possible diagnosis of the former condition.

During the four months covered by these cases I operated in all upon sixty-one patients suffering from appendicitis, counting the six in whom this condition was incidentally found in connection with gallstones, so that apparently, according to this series of cases, 33 per cent. of all gallstone cases had appendicitis, and only 10 per cent. of all appendicitis cases had gallstones. It should be borne in mind, however, that the latter proportion may not be correct, because it seemed unwise in many cases operated upon for acute appendicitis to examine the gall bladder, while the appendix was examined in all cases operated upon primarily for the relief of gallstones.

From a clinical standpoint these observations are undoubtedly of value, because they show the importance of examining the appendix when operating for the relief of gallstones. Of these eighteen cases, six would have undoubtedly continued to suffer after the gallstones were removed, had not the diseased appendix been excised. If a vertical incision is made through the edge of the right rectus abdominis muscle, the cecum and appendix can be brought up for inspection, and in case of extensive adhesions this incision can safely be extended downwards sufficiently to make the removal of the diseased appendix possible.

On the other hand, in case one suspects the complication of appendicitis with gallstones, one can readily remove the diseased appendix through an incision made through the right rectus abdominis muscle in a position opposite McBurney's

point, and from this incision one can readily examine the gallbladder.

CASE No. 7372.—A married woman, 63 years of age, came under my care March 18, 1900.

History.—Her family history was negative. She has sustained the ordinary diseases of childhood. Menstruation appeared at the age of 18 and was always regular and painless. She was married at the age of 25; had seven normal labors and one miscarriage at three months. The menopause appeared at the age of 40. During the past twenty-three years she has had repeated attacks of pain in the epigastrium, usually accompanied by vomiting, lasting from two to fourteen days, and occurring from one to six times a year. She was never jaundiced. Nine weeks ago she had a severe attack of pain in the right hypochondrium, accompanied by vomiting and chills. The pain was excruciating for about two hours, and the patient remained in bed for about one week. The urine was very dark in color; the stools were not observed. She has had three similar attacks since. Three weeks ago she had an attack accompanied by jaundice and lasting about a week. The last attack began one week ago and has been continuous.

Present Condition.—The patient is fairly well nourished, but considerably under her usual weight; tongue is clean and dry; complexion good; appetite fair; bowels move regularly, except during attack, when she is constipated; temperature normal, pulse regular, arteries tortuous and walls firm; heart, lungs and kidneys normal; abdomen somewhat distended; considerable tenderness is felt in both hypochondriac regions upon pressure; entire abdomen is somewhat tender; there are no friction sounds over gallbladder and no abnormal dullness in abdomen.

Diagnosis.—Gallstones.

Operation.—An incision was made through the edge of the right rectus abdominis muscle, reaching from a point even with the umbilicus three inches upwards. It was necessary to lengthen this incision slightly in a downward direction in order to bring up the cecum and appendix. There was a strong adhesion three-fourths of an inch wide from the cecal end of the appendix, extending from the appendix to the peritoneal covering of the iliacus muscle, making a short bend of the appendix. The end of the appendix was club-shaped and contained gas, which could not be expelled by pressure. The ap-

NAME AND OCCUPATION.	NO.	AGE.	DATE OF ADMISSION AND DISCHARGE. 1900.	DIAGNOSIS.	TREATMENT.
1. Mrs. S. A. Housewife.	7209	64	February 7. March 15.	Gallstones.	Laparotomy. Removal of 50 stones.
2. Mrs. W. B. Housewife.	7237	46	February 13. March 17.	Gallstones in gallbladder and common duct.	Laparotomy. Cholecystotomy and choledochotomy.
3. Miss B. Nurse.	7256	Not given.	February 18. June 4.	Gallstones in gallbladder in cystic duct.	Laparotomy. Loosening of adhesions and removal of stones.
4. Mrs. C. W. Housewife.	7372	63	March 18. April 29.	Gallstones; chronic appendicitis; appendix containing gas and fecal matter; extensive adhesions.	Laparotomy. Cholecystotomy and excision of appendix.
5. Mrs. F. J. Housewife.	7384	29	March 20. May 2.	Gallstones.	Laparotomy. Cholecystotomy.
6. Mrs. F. S. Housewife.	7386	34	March 20. May 15.	Gallstones in gallbladder; chronic recurrent appendicitis; appendix containing fecal concretions.	Laparotomy. Cholecystotomy. Excision of appendix.
7. Mrs. J.M.M. Housewife.	7414	36	March 26. April 30.	Gallstones in gallbladder; recurrent appendicitis; fecal concretions.	Laparotomy. Removal of gallstones. Cholecystotomy. Excision of appendix.
8. Mrs. L. H. Housewife.	7461	51	April 8. May 6.	Gallstones in gallbladder.	Laparotomy. Cholecystotomy. Removal of 42 gallstones.
9. Mrs. M. H. Housewife.	7474	34	April 10. May 18.	Gallstones in gallbladder.	Laparotomy. Cholecystotomy. Removal of 6780 stones.
10. Miss J. J. At Home.	7475	26	April 10. May 30.	Gallstones in gallbladder.	Laparotomy. Cholecystotomy. Removal of 3 stones.
11. Miss C. P. Nurse.	7492	38	April 16. May 10.	Gallstones in gallbladder and common duct.	Laparotomy. Cholecystotomy. Removal of stones.
12. Mrs. S. S. Dressmaker	7501	40	April 17. May 26.	Gallstones in gallbladder, chronic appendicitis with enterolith.	Laparotomy. Cholecystotomy. Removal of stones. Excision of appendix.
13. Mrs. C. G. Housewife.	7508	33	April 19. May 15.	Gallstones in gallbladder.	Laparotomy. Cholecystotomy. Removal of stones.
14. Mrs. J. K. Housewife.	7509	58	April 19. May 3.	Gallstones in common duct.	Laparotomy. Removal of stones. Choledochotomy.
15. Mrs. C. W. Housewife.	7527	39	April 24 June 14.	Gallstones in gallbladder.	Laparotomy. Cholecystotomy.
16. Mrs. Dr. B. Housewife.	7529	42	April 24. May 29.	Gallstones and chronic appendicitis; appendix extensively adherent; contains enterolith.	Laparotomy. Cholecystotomy. Excision of Appendix.
17. Mr. C. E. Fence Building.	7553	48	April 29. June 14.	Gallstones and appendicitis.	Laparotomy. Excision of appendix. Cholecystotomy.
18. Mr. C. W.N. Farmer.	7695	24	May 28. May 30.	Gallstones in gallbladder.	Examination.

NOTE.—The large number opposite each name corresponds with the number in the Hospital records, and is used for purposes of identification

pendix contained soft fecal matter. The appendix was removed and the stump buried in the cecum.

The gallbladder was as large as a hen's egg and contained thirty-five strongly faceted stones varying from one-sixteenth to one-half inch in diameter. They had evidently been exposed to friction for a long time. One stone, one-fourth inch in diameter, was in the common duct. By inserting small dressing forceps and dilating the biliary duct, pressing the common duct between finger and thumb, it was possible to shove the stone back into the gallbladder and remove it. The gallbladder was attached to the peritoneum and drained. The patient made a normal recovery, leaving the hospital five and one-half weeks from the date of operation.

CASE No. 7386.—This patient came under my care at the Augustana Hospital, March 20, 1900, and is a married woman of 34, with a good family history.

History.—Was always well as a child. Menstruation commenced at the age of 15 and was regular and painless. She was married at the age of 22; had one pregnancy at the age of 24, but miscarried at five and one-half months. Her health was impaired for six months following this experience. Eight years ago she began to be troubled with slight attacks of colicky pain in the region of the epigastrium. These pains continued for about one-half hour and were frequently repeated during the period following, at intervals of from one week to a month. These attacks were supposed to be due to gastric disturbances. She was then well for a year and a half, when the attacks returned with greater severity. They have persisted ever since. When the patient has been confined to liquid diet she has felt fairly well, but on attempting to eat solids she has invariably suffered. During all this time she has been under treatment for gastric disturbances. One year ago she examined her stools after one of her attacks and found several gallstones. Since this time she has taken olive oil at intervals and has always felt better for it. During the past six months she has noticed some pain in the right inguinal region. Previously her pain had always been confined to the region of the epigastrium.

Present Condition.—The patient is obese; pulse and temperature are normal; tongue somewhat coated; appetite fair; bowels regular while she takes olive oil; heart, lungs and kidneys are normal. The abdominal walls are exceedingly thick and there is a considerable amount of tenderness, especially in the right inguinal region.

Diagnosis.—Gallstones, complicated with appendicitis.

Operation.—An incision six inches in length was made in the right linea semilunaris. The layer of fat being unusually thick, the incision, down to the fascia, was extended above and below for a distance of four inches, making the entire incision through the fat fourteen inches, in order to make it possible to manipulate the intra-abdominal structures. The appendix was surrounded by a mass of omentum which extended below and behind the cecum; it was found universally adherent. In order to facilitate its removal, two hemostatic forceps were applied to it, one at its junction with the cecum, the other one-eighth inch beyond this point. It was then severed betwen these two forceps; the omentum and adhesios were then ligated and the appendix removed with the mass of omentum surrounding it. Its cecal end was almost completely obliterated, and it contained four fecal concretions the size of a lemon seed, and a small quantity of pus and mucus.

The gallbladder was the size of a hen's egg and contained thirty-six gallstones varying in size from that of a filbert to that of a pea. The stones were all strongly faceted. The gallbladder was universally adherent to the liver, the stomach and the omentum. Its walls were much thickened and it was impossible to bring its lower end up to the parietal peritoneum The upper end was sutured to the parietal peritoneum; to the lower end a piece of iodoform gauze was sutured with catgut, and this was passed out through the upper angle of the wound. The gallbladder was drained and the abdominal walls closed up to the point of drainage. The gallbladder besides the stones contained a quantity of mucus which was evidently septic. As a result of this a marked suppuration of the wound occurred, and the patient was not able to leave the hospital until nine weeks after the time of the operation. But she recovered fully.

CASE No. 7414 came under my care at the Augustana Hospital on the 26th of March, 1900. The patient is a married woman 36 years of age, and gives the following history:

History.—Her family history is good. She had always been in good health with the exception of having suffered from typhoid fever ten years ago. She had suffered for many years from a feeling of soreness in the right hypochondrium, and during her convalescence from typhoid fever she had severe colicky pains in the region of the gallbladder. During the following year she had repeated attacks at short intervals. These became less frequent but more severe. Six years ago she gave

birth to a child normally. After this she was free from the attacks for two years; then she had sudden attacks almost daily for a year, when she became pregnant again, remaining free from attacks until the birth of her child, since which time the attacks have been nearly constant. She has never been severely jaundiced, but the sclera has been slightly yellow. Occasionally minute gallstones have been found in the feces. The pain has been so severe that the patient has acquired the morphia habit, taking as high as two grains, in divided doses, during one hour, but rarely taking more than six grains during the twenty-four hours.

Present Condition.—Patient is well nourished; pulse and temperature normal; tongue clean; appetite good; bowels regular; heart, lungs and kidneys normal. Slight tenderness under right costal arch; liver is not perceptibly enlarged; tenderness in right inguinal region.

Diagnosis.—Gallstones.

Operation.—An incision three inches long was made through right rectus abdominis muscle, from a point opposite the umbilicus upwards. The cecum and appendix are brought into the wound; the latter is four inches long, and has an exceedingly thick mesentery, extending beyond the distal end. The appendix contains four fecal concretions which cannot be forced into the cecum through a contracted cecal end. The appendix was removed and the stump inverted into the cecum. The gallbladder was found universally adherent to the liver, the omentum and the transverse colon. It was shrunken to the size of a walnut, and could be located only with difficulty after separating some of the adhesions. It contained two small cubical gallstones the size of a kernel of corn; a third one of the same size and form was found tightly wedged into the biliary duct, and could be removed only after being crushed by means of a small curet, which was inserted along its border.

A gauze drain was attached to the gallbladder by means of catgut stitches, the gallbladder tamponed with iodoform gauze and a glass drainage tube passed down through the abdominal wound to a point behind the gallbladder. The remaining portion of the abdominal wound was closed by means of stitches.

The patient made a normal recovery, leaving the hospital in a little less than five weeks from the time of the operation.

CASE No. 7501.—A married woman, 34 years of age, came under my care April 17, 1900.

History.—Her mother died at the age of 62, of tuberculo-

sis of the lungs; one sister died of the same disease at the age of 47; otherwise family history is good. She suffered from children's diseases; menstruation began at the age of 14 and has always been regular and painful; was married at the age of 25, and has experienced two normal pregnancies. During the past two years menstruation has been slightly irregular, being from two to five days late. Two years ago she noticed a swelling in the right hypochondriac region which has become more and more prominent; four months ago this become tender; the size of this mass has changed from day to day. The patient has never been jaundiced, but the color of her skin is not clear; she has never had biliary colic.

Present Condition.—Patient is well nourished; tongue slightly coated; appetite fair; at times has feeling of pressure in epigastrium and eructations of gas; bowels regular; pulse and temperature normal; heart, lungs and kidneys normal. There is a slight enlargement of the left, and considerable enlargement of the right lobe of thyroid.

Abdominal.—The abdomen is slightly resistant and there is tenderness in the right inguinal region. Under the right costal arch a smooth mass can be felt and palpated between two examining hands; it moves downward upon deep inspiration and can be held down after expiration.

Diagnosis.—Cyst of gallbladder.

Operation.—An incision six inches long was made through the right rectus abdominis muscle, with its middle portion the umbilicus. The cecum was brought up into the wound, exposing an appendix three and one-half inches in length, constricted at the cecal end and containing a fecal concretion the size of a date stone; the appendix was removed.

The gallbladder formed a cyst the size of a large fist, containing clear viscid fluid; it also contained three gallstones, conical in shape and three-fourths inch in diameter; one of these stones was tightly wedged into the neck of the gallbladder, with its sharp end projecting into the biliary duct; it required a considerable amount of force to press this stone back into the gallbladder; the gallbladder was tamponed and drained and attached to the parietal peritoneum, and the abdominal wound was closed up to this point.

The patient made a perfect recovery, leaving the hospital five and one-half weeks from the time of the operation.

CASE NO. 7529.—This patient, a married woman 42 years of age, came under my care April 24, 1900.

History.—Family history good. She was well as a child;

menstruation began at the age of 15; was regular and painless; the menopause occurred at the age of 14. She was married at 27 and had one normal pregnancy. Until one year ago her health was good with the exception of suffering from sick headache, accompanied by vomiting bile, but this has become less frequent during the last few years. During the past year she has had occasional slight pains in the abdomen, especially under the right costal arch; considerable eructation of gas; bowels have been constipated.

Present Condition.—Patient is farily well nourished, but weighs thirty pounds less than a year ago; complexion is fair; tongue clean; appetite good; three or four hours after eating she has an empty gnawing feeling in the epigastrium, from which she also suffers in the morning, and at these times she often vomits bile, which relieves her distress; temperature 99 degrees, pulse 84; no jaundice; heart, lungs and kidneys normal; abdomen slightly scaphoid, appendix palpable at McBurney's point; slightly enlarged. There is some gurgling in the abdomen, and almost directly under the right costal arch there is a smooth, somewhat movable mass which passes down with deep inspiration so that the lower pole is below the umbilicus; it can be held there after the liver recedes.

Diagnosis.—Chronic appendicitis; cholecystitis; floating kidney.

Operation.—Incision made through right rectus abdominalis muscle at its upper third three and one-half inches in length. The cecum and appendix were brought into the wound, the latter being four and one-half inches long and containing an enterolith one-half inch in its smaller and three-fourths inch in its greater diameter.

There is a constriction about the middle of the appendix, due to the twist caused by the adhesions formed by a portion of the appendix opposite the mesentery to the peritoneal covering of the iliacus muscle. The mesentery is very narrow, but extends to the end of the appendix; the appendix was excised.

The gallbladder was strongly adherent to the omentum and distended to the size of a hen's egg; no biliary calculi felt within it. The contents of the gallbladder were aspirated, consisting of a viscid fluid containing fine, black sand; it was sutured to the parietal peritoneum, tamponed and drained, and the abdominal wound closed up to this point.

Nephrorrhaphy was performed for relief of the floating kidney. The patient recovered, leaving the hospital four and one-half weeks from date of the operation.

CASE No. 7553.—A married man, 48 years of age, who came under my care at the Augustana Hospital, April 29, 1900, giving the following history:

History.—He had always been in fairly good health until about twelve years ago, when he began to suffer from what was supposed to be gastric disturbance. At this time he suffered from acute indigestion, his attacks coming on suddenly and being accompanied by severe pain and nausea. He received internal treatment at intervals during this time, but was never entirely free from the sense of discomfort. Two years ago these attacks became so frequent that he was practically unable to work at his trade in the wire mills. The patient has never been distinctly jaundiced, but the color of his skin has not been clear for a number of years.

One year ago the patient consulted me and I then made a diagnosis of gall stones and advised an operation. This was refused and the patient returned to his home and continued the internal treatment until the date of his admission to the hospital.

Present Condition.—The patient is well nourished; tongue coated; appetite fair; constantly suffers from feeling of fullness in region of stomach; bowels constipated; pulse and temperature normal; heart, lungs and kidneys normal. There is a slight enlargement of the liver, and a tenderness in the region of the gallbladder upon deep pressure. The skin has a slight yellowish tinge, but there is no jaundice present.

Diagnosis.—Gallstones in gallbladder. Appendicitis.

Operation.—An incision was made through the edge of the right rectus abdominis muscle at a point one inch below the umbilicus, for a distance of four inches in an upward direction. The cecum and appendix were brought up into the wound. The appendix was constricted at the cecal end so that a fine probe could scarcely be pased through its lumen. The distal end was enlarged to the size of a little finger, and contained a hard fecal concretion. The whole appendix was attached to the lower end of the of the cecum and had the outlines of an interrogation point. The appendix was removed.

The gallbladder was contracted closely down upon a number of gallstones. No note was made of the exact number, but there were at least one dozen stones, varying from the size of a pea to that of a filbert. All of these stones were strongly faceted, showing that they had remained in the gallbladder for a considerable length of time.

The patient left the hospital on the 14th of June, six weeks from the date of entrance.

VIII.—COCAINE ANESTHESIA OF THE SPINAL CORD.

BY CARL H. ANDERSEN, M. D.

CHICAGO, ILL

My enthusiasm must be my apology in coming before you with only brief notes of cases in which I have resorted to subarachnoidean injections of cocaine. I have been very much interested in this subject, and I regard it as one of vital interest to the profession. My object in saying a few words in regard to this method and of reporting six cases is to try and stop the wave of cocaine anesthesia which is floating all over the country and which will cause, within a short time, a great many deaths. The day I left Chicago one firm had received two hundred dollars' worth of orders for cocaine from country practitioners who wanted to use this method. These practitioners do not understand the dangers of it, and it is because of this fact that I appear before the Society at this time. On May 16, 1900, Tuffier published a paper on cocaine anesthesia of the spinal chord, and reported sixty-three cases therein without any bad or untoward symptoms. On August 22 another paper was published by him, in which there were reported a hundred and sixty-three cases without any bad results. Tuffier fails to give credit to the originator of this method of anesthesia, namely, Dr. Leonard Corning, of New York, because he was the man who first advised its use. It is just another instance of the superficial knowledge of the French and other continental investigators as regards research work that has been accomplished by Americans. They always fail to give proper credit for the work that is done on this side of the water.

The technique of Tuffier is simple. The patient is placed in the recumbent position; the iliac crests are located, and an imaginary line connecting these two creses passes through the fourth lumbar vertibra. Below that point, about one centi-

meter, and to the right, the cocaine is injected, after the skin has been thoroughly sterilized. Tuffier uses a Pravaz syringe with asbestos plunger. He sterilizes the cocaine by putting it in a solution at a temperature of 176 degrees for fifteen minutes. It is then cooled down to normal blood heat, 98½ degrees, and at the end of three hours the same thing is gone through again five or six times, when he has a sterile solution according to his method. I shall try to prove in what I have to say that his solution is not sterile. He locates the iliac crests and injects the cocaine until a few drops of cerebro-spinal fluid come out. Unless a few drops of cerebro-spinal fluid escape, it is evident that we have not struck the subarachnoidean space, and there is no use of injecting the cocaine. Tuffier claims that this method is not painful; that there are no symptoms of any consequence connected with or following the operation. These patients have nausea and emesis; they sometimes feel very sick; they often have headache which lasts from forty-eight hours to eight days. He claims that the operation is absolutely devoid of danger, as far as he has been able to trace his cases. He also states that the patient experiences no pain when the needle is inserted. He tells the patient that he is going to stick him with a needle, etc.

Being an enthusiast in surgery, I have resorted to the method in six cases.

CASE I.—This was a case of hydrocele, with a vague history. The patient was referred to me by another physician with a diagnosis of hydrocele. The patient was not examined until he was placed on the operating table. I told him at the time that under no circumstances would the testicle be removed on the right side if it was not necessary to do so. I told him that if it was necessary, I would be enabled to do the operation at two different sittings, but if he allowed me to use cocaine anasthesia in his case I should be able to ask his advice and tell him what ought to be done after opening the sac, as he would be perfectly conscious of all that was taking place. He consented to this. He was a colored man, 28 years of age, strong and healthy. The night before I performed the operation I stayed up all night trying to sterilize the cocaine according to the method advised by Tuffier, having the services of a

bacteriologist and chemist at my disposal. Believing the solution was sterile, I injected it according to the method of Tuffier, and had no difficulty in finding the medullary canal or subarachnoidean space, and injected fifteen minims of a 2 per cent. solution. In five minutes the toes of the patient became numb and he felt a strange sensation in his legs. Ten minutes from the time of the injection the operation was begun; I opened up the scrotum, found the hydrocele; also a sarcoma of the testicle. The man was informed of the condition I had found, and he was told that this testicle would have to be removed, also the vas deferens. The operation was done, the vas deferens dissected up, as well as the seminal vesicle on the right side to the bladder, the glands removed, and the patient put back to bed without feeling any pain. Anesthesia was complete. Sensation returned in four hours and forty minutes from the time of completion of the operation. He did not vomit, nor did he manifest any other symptoms. We did not drain in this case for several reasons. I was careful to tie every bleeding point that could be detected. The next morning the scrotum was filled with a large amount of fluid; the temperature was 102½ degres. Ice bags were applied, and a little later his temperature was taken and found to be 103½. I opened up the wound, drained, and the temperature dropped to normal. After this he had no bad symptoms and said he never felt better in his life. His appetite was good. On the ninth day following the operation the patient went to the bathroom, and as he was coming back through the hall he fell down. Breathing was difficult; he complained of pain in the pit of the stomach, and in thirty minutes later died. I was telephoned for at once, but being engaged in an emergency case, I was unable to reach the hospital early. It was with considerable difficulty that I obtained a post-mortem, and not having anyone to assist me, the post-mortem was very superficial. I took out the heart. I tried to get the spinal cord, but could not. The heart showed nothing except a very small clot, and I doubt very much if it was a clot. I believe this man died from pulmonary embolism, because he had no infection of the spinal chord, and the cocaine poisoning could not have anything to do with death at this late day—the tenth day. The fatal termination of this case threw cold water on my enthusiasm.

CASE 2.—September 2 I had another case, an old man, 62 years of age. I injected 8 minims of a 2 per cent. solution. The patient had varicose veins. A Schede operation was performed. He felt no pain whatever, and made a perfect recovery. Anasthesia lasted five hours and twenty minutes.

CASE 3.—This case was seen September 4 in the suburbs of Chicago. The woman was placed on a table and cocaine anasthesia was resorted to. In this case I did a trachelorhaphy, and also removed a small tumor. The woman assisted me in the operation, in that she was able to hold her own legs. As soon as I finished the operation she fell into a dead faint and remained in that condition for two hours. I thought I would be unable to arouse her. I gave one-fifth of a grain of strychnia, and used salt water by the rectum, and under this treatment she rallied.

CASE 4.—Amputation of the toe in an old man, 72 years of age. Not being able to get to the hospital as quick as I wanted, I told him that I would like to use cocaine anesthesia in his case, which I did, using only 7 minims of a 2 per cent. solution. I amputated his toe, and he made an uninterrupted recovery.

CASE 5.—This was a private patient in the Chicago Hospital. As Dr. Moyer wanted to make some electrical experiments, I invited him to see the operation. At that time, finding that the cocaine I was using was not absolutely sterile, culture experiments were made from samples of the fluid. These experiments were conducted by Professor Zeit and other bacteriologists. I had operated on this woman twice before for other conditions, and as she became badly nauseated when chloroform was administered to her, she kindly consented to have cocaine anesthesia. Being fearful that the cocaine solution I was about to use was not absolutely sterile, I had it boiled for two minutes. I then tried it on the eyes of nurses, and as it seemed to have the necessary strength, I injected it into this woman. She did not have any pain. An operation was performed at 10 o'clock in the morning; at 2 o'clock in the afternoon the patient manifested symptoms of medullary irritation. She had pain in the back and a severe headache, so much so that she seemed to be crazy. Her temperature was 96½ degrees per rectum, and did not go above that for twenty-four hours per rectum. She seemed to be paralyzed

in part of the back. I telephoned for Dr. Moyer at 12 o'clock at night, but was unable to get him, he being engaged in another case. Under the circumstances I gave one-quarter of a grain of morphine fifteen minutes after the operation, to be repeated in half an hour, if necessary. Patient awoke the next morning at 9, with a normal pulse and temperature, but with a very severe headache. Dr. Moyer said it was hysteria, but I do not believe it was. This patient has had a severe headache ever since the operation was performed. The operation was certainly a success, but the woman is in a miserable condition from the use of cocaine, I believe. She is unable to sleep very much, either during the day or at night.

CASE 6.—On September 24, Dr. Hardon had a case of appendicitis, in which he asked me to give cocaine anesthesia. I invited Dr. Moyer to see the operation. My impression was that the woman had a catarrhal appendicitis, but instead of that she had the suppurative form of the disease. The patient was placed on the table. Dr. Moyer brought his electrical appliance with him to test the areas of anesthesia. Several physicians were present to see the operation. In this case I was unable to get into the subarachnoid space. I tried and tried, but it was impossible to do so. The patient could not bend the back very well, as by so doing we might rupture the abscess in the appendix.

Dr. Moyer then suggested the use of eucaine B, which can be safely sterilized. A 4 per cent. solution of it was boiled for fifteen minutes, at the end of which time we had a perfectly sterile solution.

October 3 I was called in consultation to see a case, and after obtaining the consent of the husband, I injected 16 minims of a 4 per cent. solution of eucaine B in a woman, and performed version and used forceps. The woman experienced no pain whatever. Anesthesia lasted eleven hours and fifty minutes. In this case the method proved to be a good one. I desire to give credit to Dr. Moyer for his suggestion, because I had no idea of using it myself.

Yesterday afternoon I was asked to go to the hospital here in Asheville to demonstrate this method of anesthesia in a man who had had his leg badly crushed below the knee. In

this case I made four or five punctures and was unable to withdraw any cerebro-spinal fluid. The man was then given chloroform and an amputation was done below the knee.

Tuffier appeared before a medical society in France and said he has a perfectly sterile solution. If he makes this claim, then I have to say that he has not examined it bacteriologically. After making twenty-one experiments in connection with other practitioners, I have never been able to secure a sterile solution by adopting the method of Tuffier, which consists of raising the temperature of the solution up to 180 degrees and dropping it down to blood heat six or seven times. It is impossible to get a sterile solution by that method. Dr. Moyer has suggested dry sterilization of the cocaine, and this without doubt will be the best method to pursue. Mr. Hollister has since done some experimental work on the sterilization of cocaine, and he has found that it can be sterilized (it being put up in crystals) at a temperature of 206 degrees, keeping it at that point for three hours, and repeating it three different times, using sterile water, putting the cocaine in that, and then making an examination of it. Of fifteen different solutions, every one has been found sterile.

I have reported these cases briefly with a view to eliciting a free discussion on this subject and to try and stem the tide which is now passing over the country in regard to using this method of anesthesia. Very few general practitioners realize the dangers that are connected with it. I regard lumbar puncture as a serious operation. When we know that chloroform kills one in three thousand, can we resort to spinal puncture and have but one case of infection out of three thousand? I think not. I hope these cases will serve as a warning to practitioners, so that they will exercise considerably caution and judgment in adopting this method of anesthesia. They should not do so until it is absolutely proven to be very valuable.

DISCUSSION.

Dr. Harold N. Moyer, of Chicago, Ill.—Early last year when accounts reached us of the occasional employment of

spinal anesthesia in the clinics of Paris, it was received with considerable reservation in this country, and only occasional tentative efforts were made to employ the method, and those in cases in which general anesthesia was contraindicated. The brilliant report of Tuffier to the International Medical Congress, in which he claimed to have used it in over a hundred and fifty cases without serious results, and to have obtained perfect anesthesia in all cases, has excited widespread interest in the surgical world, and a desire on the part of surgeons to employ this method which in some cases borders on rashness. We would certainly urge surgeons to go slow with this new method. Its possible dangers, while as yet largely theoretical, are such that it should only be employed in large clinics in which ample means of bacteriological research are at hand, and, undoubtedly, only in selected cases in which the dangers of general anesthesia are considerable. It may be that in time these objections will prove to be groundless, but by that time the spinal anesthesia will have established itself on a firm foundation as a recognized surgical procedure. Perhaps it may supersede general anesthesia in all cases for operations below the diaphragm, but this we very much doubt.

It is to be remembered that this operation of injecting a solution of cocaine into the subarachnoidean space of the spinal cord is a major operation; that is, unless carefully carried out, it may involve danger to life. The technique of the injections is by no means as simple as might be inferred from the descriptions, or, indeed, from the observation of an occasional injection, as made in the clinic. Sometimes it is a very easy matter to penetrate the spinal canal, and again it is not. Undoubtedly, the position of the patient has something to do with this. The most favorable position for entering the canal is when the patient is sitting and bent forward, the spine being flexed. In this position the spaces between the arches of the lumbar vertebrae are separated as widely as possible and the needle enters the spinal canal having only to penetrate the structures between the vertebrae. The distance of the spinal canal from the surface varies in different persons. In fat individuals, or those with well-developed muscles, the distance is considerable from the external surface, and in this latter class of cases it is not always easy to be sure of the anatomical landmarks. There may be a partial ankylosis of a rotation of

the lumbar vertebrae, or rigidity of the spinal muscles, all of which conditions prevent that normal flexion in the lumbar portion of the spine necessary to separate the laminae so that the needle will readily penetrate the canal.

The immediate dangers of subarachnoidean injections of solutions of cocaine seem to be slight. Several deaths have been reported after this method of anesthesia, but a careful analysis does not show that they were directly due to the local anesthesia. Depression not infrequently follows, due to the toxic action of the cocaine. This is to be expected, as the same effects follow cocaine when applied in the nose or other portion of the body in which it is absorbed into the circulation. We should expect more rapid and more pronounced toxic effects from the injection into the subarachnoidean space because of its rapid absorption.

As to the remote dangers, practically nothing is known. It may be that weeks or months after this injection degenerative changes will be set up. This latter supposition, however, is improbable, as the injection is not made into the spinal cord, but merely into the subarachnoidean space, and is there brought in contact with the nerves after they emerge from the spinal cord. The efficiency of the anesthesia is due to the fact that the nerve sheaths are there thinnest, and all of the sensory nerves are gathered together in a small space. With such anatomical peculiarities, a comparatively small dose of cocaine is capable of producing profound and lengthy anesthesia. The dangers from the puncture itself are practically *nil*. There are no structures of importance in this region that are likely to be injured, and no large vessels that could be punctured and give rise to hemorrhage of any consequence. Lumbar puncture is in effect what it is, and that has been employed with sufficient frequency to have established its comparative innocence. To be sure, a number of cases of death have followed lumbar puncture, but these were cases of meningitis or other conditions in which intracranial and intraspinal pressure was greatly increased, and there was proportionately rapid evacuation of fluid. In the case of lumbar puncture, made for introducing a fluid, only so much of the cerebrospinal fluid is allowed to escape through the needle as is sufficient to establish the fact that the end of the instrument is in the subarachnoidean space.

A possible source of danger is in the contamination by pathogenic germs of the injected fluid. Boiling a solution of cocaine destroys or modifies its anesthetic properties. The cocaine is not decomposed, and its toxic effects are not altered, but there is some peculiar change in its molecular arrangement by which the anesthetic effect is impaired. So far as we know a sterile solution of cocaine, having its full physiological effect cannot be prepared. Discontinuous heating to a temperature of 106 degrees F. is said to furnish the most efficient means of sterilizing, but, as is well known, such a temperature will not destroy the spores of anthrax or other resistant germs. Many pathogenic germs are, of course, destroyed by such a temperature, and it is better to use one so treated than one in which no effort at sterilization has been made. It is unnecessary to discuss here the possibility of the introduction of pathogenic germs; that may happen in any fluid that is not sterile, and the cocaine solution cannot be sterilized. The danger of infection, if reasonable care is taken in preparing the solution, is not great, but still it should be taken into account in employing the method. One fact is to be borne in mind—we may introduce into a very favorable culture medium a germ. In ordinary wounds the tissues are capable of taking care of a certain number of germs, depending, of course, upon their virulence and other factors. It is an established fact that the serum of the blood, and perhaps the tissues, have a certain antiseptic power. It is indeed possible that the corpuscular elements, notably the leucocytes, contribute to protect the organism from the invasion of pathogenic germs. The cerebro-spinal fluid probably has no such power. Its chemical constitution shows that it is an admirable culture medium, and a germ once introduced in these situations would meet with most favorable conditions for its development.

Spinal anesthesia is an atractive surgical topic, and one that is destined to lead to a method which will add considerably to the safety of anesthesia. Of this we feel quite certain, and it is for this reason that we earnestly urge conservatism in the use of the method, that accidents may be avoided. It would be most unfortunate at this time to have a series of disastrous results, which would lead to the abandonment of the procedure perhaps for a number of years, until someone has

the courage to take it up and carefully and conservatively work out the details.

Eucaine B is only about one-third as toxic as cocaine, and, while its anesthetic properties are somewhat less, it is probable that it is quite sufficient to meet the indications in spinal anesthesia was not successful. He used a 2 per cent. solution, succesfully. Dr. Murphy has used it in one case, and in this anesthesia was not successful. He used a 2 per cent solution, but this was too weak to give the desired anesthetic effects. It is possible that with a 4 per cent. solution better results might have been reached. One great advantage is that eucaine is not altered by boiling, and thus can be perfectly sterilized. There is also the probability that other substances can be added to cocaine or eucaine solutions which may increase their anesthetic efficiency. A solution of suprarenal extract, which can be perfectly sterilized, might be added to the cocaine solution with possible advantage. It causes a contraction of the blood vessels, and would interfere with the absorption of the cocaine after injection and prolong the anesthetic effect. The effect of this drug is to contract the peripheral arterioles, and in this way it would diminish shock, and, by delaying the action of the cocaine, would tend to lessen the toxic effects of the latter drug. This suggestion is entirely theoretical, but it is one of the possibilities in the method that occurs to us.

We certainly deprecate haste in the adoption of the new method of anesthesia, as anything like its extensive application by the general practitioner and surgeon will unquestionably result in disaster. This would give what promises to be a valuable addition to medical science a bad name at the outset.

DR. HENRY P. NEWMAN, of Chicago, Ill.—I was very much pleased to hear what Dr. Andersen had to say regarding spinal anesthesia, but I was more pleased to hear the precautionary statements of Dr. Moyer. It goes without saying that an immense amount of mischief can come from this procedure, if it is practiced indiscriminately. · There are attractive features connected with the method, but one can readily see how much injury may be done if these solutions are not sterile. I

have not used this method of anesthesia for that reason. What physician in this hall would care to have an unsterilized solution of cocaine injected into his subarachnoid? I venture to say that there is not a man present who would take any such risk. This is a good application of many of our surgical procedures. It is difficult for me to reconcile the statistics of Tuffier (120 consecutive cases without any harm) with the fact that he uses what is practically an unsterilized solution.

DR. EMORY LANPHEAR, of St. Louis, Mo.—I think the explanation of Tuffier's success with unsterilized solutions of cocaine is easy. Dr. Andersen has told us that bacteriological examinations of the solutions in Chicago showed the presence of bacteria. He must add to this information, in order to make it of value to us, that these were pathogenic bacteria. The ordinary cocaine in a new package, as it comes from the manufacturer, is fairly free from pyogenic micro-organisms, and these are the ones which cause infective inflammations in the subarachnoidean space or elsewhere. Taking, then, sterile water and the cocaine from the manufacturer's original package, free from pyogenic cocci, Tuffier might introduce this solution without harm, though at the same time he may introduce bacteria into the spinal canal which would not cause inflammation, because they are innocuous in the human organism. Of course, however, the possibility of using cocaine contaminated with pathogenic organisms is a danger not to be ignored. We might find in it the streptococcus or the staphylococcus, and of course if they be present we will have all of the dangers before us to which allusion has been made.

In the use of this method I have sterilized the cocaine by subjecting it to a sufficient dry heat (by the method advocated by Dr. Andersen) and then have used sterile water. I have not failed thus far in producing anesthesia with a cocaine solution thus prepared. But I wish to call the attention of the Association to the fact that the securement of the serile solution is not the only desideratum to be desired. Of greater danger still than an imperfectly prepared solution is the liability not to sterilize the skin of the patient. Every skin contains in its pores the germs of suppuration, and unless the greatest care is exercised to thoroughly sterilize the skin by scrubbing and by the application of alcohol and ether and other germicidal preparations, we are liable by the mere act of puncture to carry infective material into the spinal canal. I would there-

fore urge upon you, gentlemen, who are going to follow the footsteps of Murphy, Tuffier and Andersen, to use the utmost precaution to sterilize thoroughly the skin at the point of puncture. More than this: It is essential that we employ instruments which may be thoroughly sterilized. These injections cannot be made with the ordinary hypodermic syringe. We must have a special instrument in order to get the solution into the spinal canal. For this purpose I have been using a platinum needle, four inches in length, with a dull point, the latter being to prevent injury to the cauda equina, because in using the ordinary long four-inch needle of the larger syringes we might do irreparable injury to the contents of the spinal canal by too deep puncture. Therefore, a dull needle is employed. Steel will not do, because it is liable to break in puncturing the thick fibrous tissues through which we have to go. Platinum, or preferably gold, needles must be used. A hypodermic syringe must be used which can be boiled, one with a metal piston and metal body or glass body. The syringe must be boiled just before the moment of use. With these precautions I do not feel any hesitancy in injecting the spinal canal; I have done it a number of times and have had no immediate bad effects. I believe, however, that the suggestion of Dr. Moyer to use eucaine B is a most valuable one; one which will do away with the dangers which we know cocaine possesses. Some of the most alarming symptoms that I have had the misfortune to encounter presented themselves as the result of subcutaneous injection of cocaine solution. In some cases there was the most alarming collapse, but while no death has occurred (which I cannot say in the use of chloroform in my practice), I am like Dr. Andersen, I have passed many sleepless hours worrying over an apparently impending fatality of a patient in whom cocaine had been injected. With eucaine B, as suggested by Dr. Moyer, I feel that we have an anesthetic of much greater safety, and one which the average practitioner will find greater satisfaction in using than he would with the cocaine that has been heretofore employed.

In one of my cases, I think the last one, in which the cocaine was used, anesthesia was not perfect. This was an abdominal section that required about forty minutes. At the end of twenty-five minutes anesthesia was incomplete; therefore the expedient was adopted which many of you, I dare say, will have to adopt, namely, the inhalation of a little bit of chloroform. It is rather singular to observe, too, how a few "whiffs" of chloroform will hasten the cocaine anesthe-

sia, and the patient is soon ready for operation, allowing the chloroform narcosis to speedily pass off, and a conversation can be soon carried on by the surgeon with the patient. In my last case we had a peculiar phenomenon present which upsets the statement that has been made that operations cannot be done above the umbilicus under cocaine anesthesia. In this instance the anesthesia was perfect up to and including the axillæ, so that amputation of one or both breasts could have been accomplished without the least difficulty, and this at a period of the anesthesia when the woman was conversing right along as to whether or not the operative procedures were going to give her pain.

DR. A. H. CORDIER, of Kansas City, Mo.—I would like Dr. Andersen or Dr. Moyer to explain the idea of the anesthesia being so great in the case of Dr. Lanphear. The nerve supply of the upper and lower abdomen is probably from the seventh lower dorsal vertebra, and if this injection is made as low down or below the lower extremity of the cord, I would like to have explained how this anesthesia is produced along the distribution of nerves coming out as high as the sixth or seventh dorsal vertebrae, as to whether it is carried upwards through the cord, or fluid, which surrounds the cord, or if the injection is made after puncturing the nerves that supply the lower extremity.

DR. MOYER.—I don't know. Perhaps Dr. Andersen can answer the question intelligently.

DR. ANDERSEN (closing the discussion).—I appreciate the remarks of Dr. Moyer very much. He has given me a great deal of advice in connection with this new method of anesthesia and several original ideas, which I have used. He certainly is right in pointing out the dangers, and that no one should attempt to use this unless he has all the clinical facilities which a well-appointed hospital gives him. The remarks of Dr. Lanphear were very good, as to whether there are pathogenic germs in the solution or not. In the first two examinations colon bacilli were found. In all the later, no pathogenic germs were found, but always many non-pathogenic, showing that we did not have a sterile solution. Tuffier speaks of using a syringe, the asbestos plunger of which I think is wrong. Asbestos will break and small particles will be carried into the spinal canal. I use an ordinary hypodermic syringe, that is

made to be boiled; that is, of nickel and steel. I use a platinum needle with a short bevel and never puncture the skin with the needle, always first making a small cut through the skin, and then inserting the needle into the cut, so as not to carry any infection from the skin into the spinal canal. In this way I am reasonably certain of not infecting the spinal fluid. With reference to the height of anesthesia of which Dr. Cordier spoke, I do not see why it should not extend higher up, because there is certainly a current going on in the cerebro-spinal fluid, and there is no reason why this should not carry anesthesia up as well as down. If I should use a larger dose of the cocaine, I feel quite certain that I would have anesthesia as high up as the neck or ears. In most of my cases the anesthesia has extended as far as the third and fourth rib.

IX.—NOTES ON FRACTURES OF THE MAJOR BONE-SHAFTS CONTIGUOUS WITH OR INVOLVING THE ARTICULATIONS.

BY THOMAS H. MANLEY, Ph.D., M.D

NEW YORK, N. Y.

The past year has been one of notable activity in the literature of fractures, as no less than seven works by different authors have issued from the press in this period. None of them, however, chronicles any very radical departure from the principles promulgated in the early part of the present century by Cooper, Malgaigne, or Dupuytren, or later by the classic works of Hamilton and Stimpson.

Revolution in therapy is only noted in open fractures and some of those involving the joints. On the latter a few brief observations are herein submitted.

Distinguishing characteristics of joint fractures or those in proximity to the joints of the extremities.

Fractures contiguous with or involving the articulations are the most frequent of all; when intra-articular or incomplete, precise diagnosis is often difficult and sometimes quite impossible; their treatment is frequently unsatisfactory; de-

formity and defect in function are not unusual. Intra-articular fractures rarely fuse by ossific union. Traumatic osseo-arthritic lesions are attended with an excess of pain, stiffness and muscular wasting. Constitutional conditions very frequently complicate a fracture involving the arthritic structures.

Anatomical considerations.—With the single exception of the elbow, fractures opening into joints are very rarely seen in children. The immature elastic heads of the bones in youth resist the influence of violence better than the diaphyses.

These fractures may be anatomically grouped in three classes, viz., first, those entirely extra capsular—the most common; second, those in which the breach in the bone extends from without, in, across or through the attached capsule into the articulation, the next in order of frequency; third, those entirely intra-capsular—the least frequent.

An articulation is a complete mechanical structure, the center is a fulcrum for a powerful leverage, highly vascular in youth and always richly endowed with a nerve supply on its periphery. Synovial investment of the articular surfaces provides the necessary secretions. This fibrous structure is continuous with the perichondrial and osseous envelope, and at various larger joints is in direct communication with large bursal pouches and the thecal sheaths.

Besides the ligaments all the larger articulations acted on by the long shafts are powerfully supported by muscle and tendon. At the elbow, the wrist, the knee and the ankle joints large nerve trunks are lodged in close proximity to firm, unyielding structures.

The histological composition of the cancellous heads of the bone shafts, while widely different from those of the diaphyses, in elderly people it is less vascular. Medullary elements and a periosteal investment are wanting, nevertheless, in the event of a fracture, not wholly intra-articular ossific union is as rapid and complete as when the diaphysis is involved.

The full nutrition and strength of an arthrodial joint is dependent on free muscular action. When anchylosis locks an

articulation its muscles, now without function, waste and shrink.

Extra-capsular fractures are those which involve the compact epiphyseal ends of the shafts. They may occur at any period, but are specially common in youth or middle life.

Fractures extending from an articular head into a joint, sprain-fractures, are most frequently encountered at the ankle in the adult and the elbow in the child.

Intra-capsular fractures are seldom seen except at the hip joint and at the humero-scapular articulation.

Complications and pathology.—All fractures implicating any articulation are peculiarly complicated; all impair the ultimate strength and action of the joint; some quite completely destroy it. The nearer the fracture to a joint the greater its gravity. It always implies the application of unusual or great force, or an organic defect in the bone elements, which will render treatment tedious, repair imperfect and impediment in function certain.

Fracture-luxation.—Simultaneously with a complete break of bone extending into an articulation or entirely within it, there are often varying degrees of dislocation. This notably is the case in wrist, elbow, hip or ankle fractures, so that here not only are we compelled to attempt reduction of the joint, but also the replacement of the fragments. Moreover, the mechanism of the entire joint has been deranged, the synovial membrane has been torn, the ligaments, periosteal investments and other soft parts have been contused, over-strained or lacerated. In some of this class with a serious degree of obvious damages to the parts, there is a partial diastasis, the ligaments have suffered detachment, there is a large intra-articular hemorrhage with a fracture or split in the long axis of a shaft, opening into the joint cavity; there has been a twist or violent wrench sustained and we have to deal with a complicated fracture.

Some of the most painful and serious manifestations, immediate and remote, after many fractures contiguous with or involving the joints of the long bone shafts arise from injury of the great blood trunks or nerves. Ischemic neuralgia,

thrombo-phlebitis, endarteritis, sanguineous effusion are not uncommon sequelæ. The severe damage to the vessels will frequently account for the delay in repair of the fragments and in the absorption of inflammatory deposits. Extensive joint injury, accompanied with disintegration, is invariably followed by inflammatory implication of the muscles, especially those on the proximal aspect of the lesion. These structures at first infiltrated, swell and soften and later atrophy and contract, leaving a stiff, painful joint. In the young and vigorous these structures recover in time practically their full functional activity; but in many, suffering from a constitutional diathesis, the pathological changes induced, linger over a long period or may abide throughout life.

From the foregoing brief and incomplete review of various structures involved in the class of injuries under consideration, it is obvious that the osseous lesion may be of the least significance, or at all events is but one of several which call for special treatment. When the circulation is ample and the full nutrition is maintained, *restitutio ad integram* may be looked for through the powers of nature aided by art, but under various circumstances of age and the special character of the fracture, nature's effort at repair may be incomplete or abortive; the defective union is attended with a painful deformity. Endostitis of the cancellous tissue is sometimes succeeded later by an aseptic necrosis. Finally union may totally fail and the loose detached fragment may become a foreign body.

Diagnosis.—When deformity is tangible and obvious the diagnosis of a fracture into or near an articulation is simple, but a subluxation, an intumescence or inflammatory swelling may induce such a change on the surface aspect of the part as to suggest a probable osseous disorganization. Several times have I seen such conditions mistaken for fracture, especially at the wrist and ankle joints. Again, in some instances, after joint injuries, or parts near them, swelling promptly supervenes and with muscular rigidity combined, and so fixes the fragments that nothing less than a most cautious and critical examination will reveal the existence of a fracture. With this

class Mulgaigne warned practitioners to be reserved in diagnosis at the first examination.

Technique in the Diagnosis of Obscure Cases.—Confronted by an injury of a limb in which the evidence of a fracture is obscure a responsible task lies before us. An oversight may bring chagrin or involve us in a civil action. It is certainly true that when a fracture is attended with no displacement an accurate knowledge of its precise character, or even its presence, will in no radical manner influence therapeutic measures. But if a suit is in view, the presence or absence of a sundering of the bone will weigh in the adjustment for damages, and moreover the patient or relatives may insist on a definite opinion. Sometimes occasions arise when no mortal can give this without resort to free section of the tissues or possibly by inflicting serious injury to the patient. Our resources in diagnosis now are great in contrast with those of fifty years ago in fractures and other lesions.

Rest.—Among the most ancient and valuable of them all is rest in bed. There is nothing which relaxes the whole muscular system like decubitus in a comfortable bed, and no sort of apparatus ever devised can give us such results in the treatment of many shaft fractures of either extremity. If we are in doubt, then, at first examination, we will advise rest of the limb in a flexed position, with such local applications to the member as are grateful and give comfort. In a day or two muscular spasm will have passed off, resorption of effusion will have begun and painless manipulation will reveal the true condition.

Posture and a Hard, Flat Surface.—In fractures of the hip joint, of the clavicle near its articular ends, at the proximal end of the humerus, the patient should be placed in the dorsal decubitus on a firm table, with the shoulders and head raised. Posture, comparative contour and outline are valuable aids in diagnosis here.

Anesthesia and Analgesia.—An anesthetic is often desirable in hyperesthetic conditions of parts which have suffered violence. An abolition of the pain sense is of the highest value

in the diagnosis of various obscure fractures, notably in children and especially those of the hip in the adult. But the patient may object; there may be constitutional conditions present which preclude the employment of pulmonary anesthetics, or we may be without ample assistants to administer them safely.

Intra-rachidian cocainization bids fair here to set pulmonary anesthetics in the background in the near future for exploratory and all operative procedures on the trunk and the extremities. My friend, Dr. Simon Marks, of the New York Maternity, informs me that from ten to fifteen minims of 2 per cent. cocaine solution injected into the spinal canal will insure painless labor for an hour or more, and analgize all the structures of the body up to the neck. During the last two months more than a hundred major operations have been performed under its employment in the United States. There is no good reason why this remarkable agency should not be utilized with advantage in the diagnosis of obscure fracture cases, or in fracture reduction or adjustment of a very painful character.

The open incision, surgical literature shows, has not established for itself a legitimate position in the semiology of fractures. It is a procedure which involves risk, it transforms a closed into an open fracture, it tends to retard repair and affords us no substantial aid as a therapeutic measure. Hence, in any other than special or very exceptional cases can we regard the division of the tissues as at all justifiable as a means of diagnosis in fracture of bone shafts.

ROENTGEN RAY PHOTOGRAPHY.

Skiagraphy, or shadow photography, must be regarded as a disappointment as a definite and unerring aid in the diagnosis of broken bones not readily detected by the ordinary means. Some of our latest monographs on fractures abound with these photographs, but their accuracy must be discounted, unless this has been demonstrated by dissection, a confirmation wanting in all that have come under my observation. Treaves pronounce the value of the radiograph as greatly exaggerated.

Golding Bird warns us of the danger of error in skiagraphy, as does Edmund Owen and others. The following from the *New York Medical Journal* is to the point:

THE FALLACIES OF X-RAY DIAGNOSIS.

"We have never sought to belittle the value of Roentgen-ray photography in diagnosis, but we have felt from the time when the announcement of Professor Roentgen's discovery was made that there was danger of its being overestimated. Such a startling and unprecedented novelty as a means of seeing into and through opaque objects could not fail to impress unduly those enthusiastic individuals—and they exist in our profession as well as among the rest of mankind, though not, it is to be hoped, quite in the same proportion—who voice their unquestioning credulity by such a cry as, for example, 'the machine can't lie,' 'the machine' being an ordinary photographic camera or the apparatus employed in making Roentgen pictures. But it has long been known that common photography is capable of distorting the truth to a grotesque degree, and it seems that the Roentgen-ray picture may do the same thing. This is most cogently set forth in the report of a committee appointed by the American Surgical Association three years ago to report upon the medico-legal relations of the x-rays. The committee's report was presented at the association's recent meeting by its chairman, Dr. J. William White, of Philadelphia, and is printed in the July number of the *American Journal of the Medical Sciences*. There is great danger that misleading pictures, which may be made either erroneously or by design, may be admitted as evidence in malpractice cases; yet, how untrustworthy they are, when unsupported by other evidence, is shown by the facts that good clinical results in fracture cases, without impairment of function or palpable deformity, may be made to appear very bad ones in the pictures, and even fractures may be shown that have no existence, while others known to exist in a recent stage are not shown. Clearly, no conclusions in fracture cases can be invariably based upon Roentgen-ray photography alone, and it is well that such an important body of surgeons as the American Surgical Association has so expressed itself by unanimously adopting the conclusions reached by the committee."

M. Tuffier—*La Semaine Medicale*, 4 Avril, 1900—records his experiments on the cadaver with a view of determining the accuracy of the rays in fractures. After inducing a fracture

he would reduce and adjust it. Then he secured the precise relations of the fragment by compass measurements. He then radiographed it and always found errors of several millimeters. Perfect reduction of the fragments he found was seldom possible and never necessary in order to effect good union.

In the articulations involved by fracture and other coincident disorganization we can hope for little from the Roentgen rays, as either tendon, ligament or membrane is opaque to them. In my experience no two photographers will produce or duplicate the same features in a given case. In one case of injury to the wrist which came under my care, one shadowgraph showed a fracture through the head of the radius, another showed the radius entire, but a luxated row of carpal bones; while the third, which photographed both limbs, showed them precisely alike.

From the foregoing, and all that can be gathered from reliable sources, it would appear that the evidence of the skiagraph, without the confirmation of other well-known resources, must be ruled out in all obscure, dubious fracture cases.

Treatment.—The primary treatment of *closed fractures* of any part of a shaft has made no signal advance in the past twenty-five years. Our hopes for the attainment of greater perfection or less deformity or impediment in joint fractures have not been realized, and the principles of their therapy as laid down by ancient and modern writers have not been improved on in any measurable degree up to the present time. Controversy yet waxes warm on the question of material or form of splinting; or, indeed, whether any splinting at all is necessary in many; on early or late reduction, the position of the limb, early or late motion in joint fractures, etc.

Notwithstanding the chaos of opinions on modes of treatment, a large experience with the management of broken bones will convince one that in order to attain the best results our cases must be managed on some well defined system, subject, however, to frequent deviations.

Displacement of the Fragments or Impaction.—Any one who has had an extensive experience with the treatment of broken

bones must regard with regret the advice generally set forth in our text books on surgery to "immediately reduce the fragments and immobilize them." In any features close to or extending into a joint this advice may often lead to disastrous consequences; notably so in certain types of Colles or fractures through the femoral neck. These two fractures are especially mentioned because of their frequency and the defect of functions which so frequently follows them. Either may be impacted; both involve a subluxation. In both the osseous elements have undergone organic changes, the bones have become hard and brittle and their nutrition is but feebly maintained by a diminished vascularity. Inflammatory changes are propagated to the joint structures and the bone lesion is early complicated by an arthritis and a tendo-vaginitis, or, as in the case of the hip, a coxalgia is provoked and maintained by the loose, mobile, proximal fragment. Sometimes these fractures are impacted, the ends of the fragments are telescoped into each other and thus immovably fixed. Shall we break up this impaction in order to obviate deformity and reduce the fragments? At the hip all are agreed that this is a fortunate occurrence, but at the wrist in a Colles fracture, this is viewed by many in a different light. It is my belief that a critical study of the cardinal features of the morbid anatomy of a Colles fracture will convince any one that this line of action is greatly to the detriment of the patient. Moreover, from a large experience in the treatment of these wrist fractures I am assured that a larger degree of utility and strength in the limb is secured by leaving the impaction undisturbed. Our aim in view here is not so much to overcome a slight deformity as to secure the early and full use of the hand and wrist. Every one knows that in many of the most distressing cases of Colles the least deformity is observed. And again, we will sometimes see a wrist with the characteristic hump or fork-back of Dupuytren, with full use of the hand and wrist, in working women who, supposing it was only a "sprain," had received no treatment at all, but perchance a liniment. Anything like violent manipulation in a fracture near a joint in an elderly person is

to be deprecated. Mobile fragments are to be reduced here when no great force is used. Immobilization in its strict sense of a fracture near or in a joint is quite out of the question. Sanguinous extravasation, effusion into the capsule and widespread cellulitis will render it entirely incompatible with an unobstructed circulation or the comfort of the patient.

Excision of the proximal fragment in intra-capsular fracture at the hip joint, with rare exceptions, means the end of the full usefulness of the articulation and the beginning of a crippled state to remain throughout life. An impaction in fracture here is a fortunate event, and hence caution should be observed in efforts at reaching diagnosis not to disturb it. In these cases when the ends of the fragments are telescoped any description of rigid immobilization or protracted confinement to bed is a species of needless torture; not only useless, so far as the local lesion is concerned, but harmful to the general health. Here the method of Lucas-Championiere comes in to advantage.

What should be our line of action in hip joint fractures with separation of the femoral fragments? By any improved mode of treatment may we hope for approximation and consolidation of the fragments, and, if not, should we be content to follow in old ruts, do some perfunctory splinting with extension, and let the patient, later, move about on crutches or by the use of a cane. It has long been my conviction that in this class of cases wherein there is practically no hope of osseous repair, in old people, aggressive surgery should be invoked; we should open freely down on the proximal fragment from the anterior aspect of the thigh and exsect it. At the same time remove or round off the sharp spiculated end of the distal, fractured end of the femoral neck.

In fractures completely through the anatomical neck of the humerus this course is pursued with safety and advantage, and there seems no valid reason why it should not apply with equal or greater advantage in intra-capsular fractures at the hip. I am acquainted with no recorded cases of this procedure having been resorted to, but there has been one in my own practice. The patient was a young man of twenty years, a

remarkable age for this accident. The case came under my care in Harlem Hospital eight years ago. After entrance the usual mode of treatment was instituted. But a week later severe pains with large tumefaction appeared just below Poupart's ligament, with marked rise in temperature and constitutional disturbances. Under an anesthetic Langenbuch's long anterior incision was made, the capsule exposed and divided and the femoral head, which had been shattered into three fragments, was removed. At the same time the irregular surface of the inferior fragment was evened off with a pliers. The deep parts were well irrigated and the capsule closed. Recovery was rapid. There resulted one and a half inches of shortening; no more than before the arthrotomy. He recovered the full use of the limb, and with a cork sole now walks with scarcely a limp.

In many of these fractures there are varying degrees of shattering of the proximal end. In an atrophic, anemic changes of advancing years, there is evidently slight, if any, direct arterial circulation through the ligamentum teres, and the imprisoned, useless femoral head serves no purpose except as a foreign body to provoke irritation and painful reflex disturbances, as with a cariesed or diseased tooth. Hence, when all hope of union is passed, the fragment should be freely cut down on and extracted. The operation required entails but a very moderate loss of blood, the joint and adjacent parts in recent cases are now well drained of extravasated blood and inflammatory deposits, and the aseptic wound should close early by primary union. This procedure would rob this fracture of its long, tedious, painful and useless treatment by means now in vogue and reduce the time of recovery from months to weeks.

Colles fracture, from the age of the patient and the peculiar complex character of its morbid anatomy, yet defies treatment in a considerable proportion of cases. An osteo-arthritis, a neuritis, or stiffness with tendo-vaginitis so commonly follow as sequelæ, combined with a diastasis and displacement of the head, that after apparent union of the fragments the hand or the fingers remain weak, stiff or helpless for a long time. In some of these cases, long after fusion of the fragments, there

are areas of the most acute hyperesthesia extending up the arm to the trunk. Melancholy, depression of spirits and other marked psychic disturbances are notably marked in this special fracture.

In markedly impacted Colles fracture with diastasis of the radio-ulnar joint, fracture of the styloid process of the ulna and a rotation and outward displacement of the carpal end of the ulna, it remains an open question whether or not fresh force should be applied to the fragments and an effort made to push them into position, and then finally fix them. From a theoretical standpoint this would seem to be the only rational course open; but, for reasons already stated, this course is impracticable, as function and strength of a joint are not incompatible with limited deformity of it. The whole question in after results after this fracture resolves itself into the degree of damage to the tendon, vascular and nervous structures, and to the interstitial changes in the elements of the radial head, rather than the quality and extent of deformity. So far, conservative or osteo-plastic surgery promises little in the way of improvement of function or relief from local discomfort in Colles fracture. We derive but little encouragement from recorded cases of osteotomy performed in these cases. Within the past year two cases have come under my care, after two or three months' treatment, in which the patients, both females, despairing of recovering the use of their limbs, urged me to do anything that might relieve the distressing symptoms and liberate their joints. One woman had her arm broken two months before. She informed me that she was placed under an anesthetic in its adjustment and a plaster cast applied. She had the typical deformity, the fingers were stiff and atrophied and all parts were exquisitely sensitive. An osteotomy was performed with a view of securing a better coaptation of the fragments and liberating adhesions, Remarkably rapid union of the fragments followed, the wound closing by primary union, but no important improvement has resulted. She later entered another hospital where the radius was again refractured and treated with the same result, when she reported to me.

My second case, a railroad accident, presented somewhat similar fractures to the first, was operated Sept. 18. In her case the greater part of the radial epiphysis was found of a soft, almost pulpy consistency, undergoing an aseptic necrosis, Since the operation she expressed herself as much relieved of the pain and stiffness in her fingers. But she yet remains in the Metropolitan Hospital, and what the final outcome of the case will be is yet in doubt.

Fractures at the elbow, intra or extra-capsular, the T-fracture, through the condyles, or epicondyles, are most commonly accidents of childhood and usually undergo repair with practically full recovery of function. In the adult after middle life they are of more serious significance. The soft parts are then prone to intense inflammation, which only subsides after extensive adhesions are formed; a troublesome arthritis with hyperostosis over the site of union, and nerve pressure, by osseous penetration or inclusion is not very infrequent. Fracture from behind through the olecranon, or below through the radial neck, or the coronoid fossa of the ulna, usually do very well by ordinary measures and seldom leave serious impediment in function.

The most serious results we note after fractures through the lower third of the humeral shaft is succeeding damage to the musculo-spiral nerve by the sharp ends of the fragments or by callus inclusion, or by pressure after union. In a considerable proportion of the cases of brachial palsy arising from this cause direct surgery accomplishes a prompt cure. The most serious results from simultaneous fracture through both the radial and ulna shafts in their upper third, is from osseous fusion of them in the course of consolidation and loss of pronation. A year ago a case came under my care of a young man who ten months previously sustained a severe fracture at the elbow, leaving the joint stiff, the forearm without the power of pronation, the wrist stiff, the hand and fingers partly paralyzed and wasted. In fact, the limb was quite useless. Before he came under my care he had surgical treatment for three months. On examination it was found that he had

had a fracture through the ulna about three inches below the coronoid process with the head of the radius luxated forward and upward. An osteoplastic operation was performed by me which yielded the most gratifying results. The dislocated head of the radius which had put the musculo-spiral nerve on a strain and had nearly crushed the median nerve through, was exsected and the callus which welded the ulna and radial shaft together was cut completely away. Full flexion of the elbow was secured, pronation of the forearm was recovered and all the paralytic symptoms overcome. In these cases at or contiguous to the elbow joint consecutive osteoplasty will frequently accomplish remarkable results.

Fractures external to the anatomical neck of the humerus, after repair, very rarely seriously impede shoulder action or involve the articulation. They are of infrequent occurrence and seldom inflict damage on any structure except the circumflex nerve. The deltoid paralysis is transient and fusion of the humeral fragments at this point is generally rapid and complete. A fracture completely through the anatomical neck, being wholly intra-capsular, is often mistaken for a true luxation. Excision of the proximal fragment is always called for in these cases.

Closed fractures of the shafts of the femur above or close to Winslow's ligament are not often attended with any special complications. Intercondyloid or transcondyloid fracture involves a free hemorrhage and a consecutive synovial, inflammatory reaction, but this rarely provokes an extensive implication of the arthritic structures, except when violence to the joint has been very considerable. In two such cases in my service in hospital during the past year union was speedy and full restoration of function as complete, if not more so, than we generally observe it after fracture of the adult shaft. These cases are seldom followed by a shortening, but when the relations of articular surfaces are much disturbed or an excessive callus forms, range of flexion is impeded and a certain degree of stiffness ensues. With the exception of sprain fractures, we meet with few others of the closed variety, extending through the

tibial head into the knee joint, a fracture through the tibial shaft, within three inches of the tubercle.

Fractures at the ankle-joint, above it or directly involving it, are frequent. That type first described in detail by Pott and Dupuytren being the most serious. Here we have a fracture of two bones, one into and one external to the articulations, together with a subluxation of the joint. In aggravated cases the extent of displacement is marked, and a weak, sensitive, stiff joint may succeed any line of treatment adopted; not, let it be remembered, from the osseous changes resulting, as from a luxated condition of the articular surfaces following a forward, backward, lateral or rotatory displacement of the tibia, with a rupture of the ligamentous support. In Pott's fracture or, properly speaking, a fracture-luxation at the ankle joint, in consequence of its special and complicating features, we must institute treatment particularly adapted to it. Here, above all other situations, early and complete reduction is necessary; not, however, until acute intumescence of the parts has subsided. This involves complete reduction of the luxation and replacement of the fragments. Full relaxation of the crural and sacral muscles and lateral decubitus of the leg and foot remove all strain on the joint and best favor a quiescent state of the disorganized parts. In order that the joint structures may be well supported and steadied during the period of repair, well moulded wood-fiber splints should be firmly applied, care being observed that they are well padded. One of the great drawbacks in these cases, is the loss of the internal ligament, which is either torn off from the inner malleolus or fractures through it, and carries the end of the apophysis with it. Quite frequently this spur of bone fails to unite, leaving the sharply cleft edge of the proximal fragment so near the surface as to be easily seen and felt. The object of Dupuytren's apparatus was to form union here, but it frequently fails, as do all others. When there is a wide diastasis of the tibio-fibula junction with a fracture low down on the fibula, the case is rendered more complex yet and difficult to effectively treat by current methods.

So far, the free, open incision and primary osteoplastic procedures have accomplished so little in this fracture-luxation that they have been discontinued. In a few cases of aggravated deformity with subluxation and a painful joint, distraint ensuing, various consecutive osteoplastic operations have been resorted to, but not with sufficient advantage to the patient as to warrant their continuance.

Fractures through the tibia just above the ankle-joint are comparatively frequent. At this point, just before the bone spreads out at its base, its diameters are most reduced and its substance is so compact that a split or fissure through the lower fragment into the ankle, in closed fractures, we must assume frequently occurs. My experience has been that when these fractures are oblique the extent of overriding of the fragments is much greater than when higher up and their reduction and retention are more difficult.

Tenotomy as an aid to reduction: Some few inctances have come under my notice of cases in which the tendo-Achillis was divided in order to effect ready reduction of the fragments here. In every instance the strength and action of the ankle-joint was impaired, after this tenotomy. This procedure, simple in its performance, is harmful in its consequence and should not be lightly undertaken.

SUMMARY.

1. Let it always be borne in mind that in fractures of bone-shafts, the nearer they are located to joints the more serious their character.

2. When complicated by a subluxation, or when a fracture extend into an articulation, troublesome complications are quite certain to follow in a large proportion of cases. In this class the osseous lesion may be unimportant as contrasted with the damage to the arthritic structures, the larger blood-vessels or the nerves.

3. The symptoms of joint fractures are not unequivocal, as there are no special characteristic features in the pain of luxation, sprains or fractures; nevertheless, as a rule after re-

action sets in, the acute suffering is greater in a joint than any other fracture.

4th. The definite diagnosis of the precise position and quality of either an intra- or extra-articular fracture, when there is doubt, is often difficult and sometimes impossible. In cases *without* displacement of the fragments, the application of great force under anesthetics to clarify diagnosis is an uncalled-for procedure, unless the patient insists on it. In consequence of the frequent errors and uncertainties attending the use of the Roentgen rays, without other confirmatory evidence, their employment alone in doubtful osseous lesions as a diagnostic agent totally unreliable.

5th. The primary treatment of closed intra-articular fractures or those in close proximity to the joint, in general, must be on these fundamental principles recognized everywhere. In intra-capsular fractures at the hip, with proper aseptic precautions, primary resection of the distal fragment will abbreviate convalescence.

X.—THE MEDICAL AND SURGICAL TREATMENT OF ACUTE AND CHRONIC LYMPH NODES OF THE CERVICAL REGION.

BY H. HORACE GRANT, M. D.

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The management of this condition is a problem upon which there is a wide difference of opinion among surgical authorities, and inasmuch as the condition is so exceedingly common, and its treatment by nearly every method more or less unsatisfactory, it seems well to keep it constantly before the minds of the profession in order that, from the data thus acquired, a satisfactory and systematic line of treatment may be agreed upon. There can be no difference of opinion in any body of scientific men as to the utility of the lymphatic glands; that, whatever other object they may accomplish, it is certain that

they distinctly and constantly screen out of the local circulating medium poisonous materials that are seeking admission to the general circulation. We are all agreed as to their great usefulness, and to the fact that their loss for any cause whatever is to be greatly deplored, and it is just as well to premise a discussion with a plain statement that no lymphatic gland should be removed, for any cause whatever, so long as it preserves its usefulness and is more serviceable than it is damaging. Hence the proposition we have to consider is, how far the usefulness of a lymphatic gland can be preserved after it becomes diseased, and whether or not in a diseased condition it is not only a useless but a menacing foreign body.

With all the study that has been given to the anatomy of this subject we are not fully able always to determine the limits and mechanism of the lymphatic protection. Nor is it possible for us always to say when these glands are healthy, when they are inflamed with non-septic or non-poisonous material, and when they have themselves become the focus for the dissemination of septic or malignant infection. When we consider the behavior of lymphatic glands inflamed from acute septic infection, and the seat of suppuration, we are confronted by a surgical problem. This is the by no means uncommon course of a septic infection received upon an extremity. Inflammation running along the course of the lymphatics of the arm is arrested in the ordinary processes of nature by the glands in the axilla. If the primary focus of the infection has been of such a degree as tends to the reproduction of the destructive focus wherever it finds a lodging, a slow process of sepsis with a moderate temperature and a limited amount of pain may become engrafted upon the constitution from these inflamed glands. Circumglandular suppuration, with softening and maceration of the glands themselves and the formation of a considerable abscess, may occur in two or three weeks' time without any profound constitutional disturbance. The diagnosis of suppuration under these conditions is to be based upon the general signs of chilly sensations, constant elevation of temperature, increased frequency of pulse, and some hectic; and

these, together with the local symptoms of enlargement more or less progressive, and tenderness, oftentimes not very marked but with a general constitutional depression, indicate the existence of septicæmia more or less severe, with probable abscess. The introduction of an aspirating needle, if needed, would complete the diagnosis. Whether simple drainage will be the best means to effect a cure is the disputed question. Undoubtedly, liberation of the pus is indicated, but many surgeons maintain that if the glands are left, even though partially disintegrated, they will be more or less reproduced, and thus add to the protection of the general constitution from subsequent infection. How this reproduction is achieved, and to what extent the glands totally extirpated are replaced, is not a matter of proof. Statistics upon this subject are not available to establish the data needed in determining present surgical indications. But comparatively few extirpations of acute septic glands have been made, and though hundreds of suppurating and non-suppurating tuberculous cases are reported, comparative analyses have not been generally made, case by case, so far as I can find, in any large number of cases. Dowd (1) gives a number of references in his careful article on the subject, but even these do not indicate very complete analysis. The surgical principles involved are not different from those of surgical pathology elsewhere, and with the advance of the art the practice is likely to change. Though many nominal objections to operation for tuberculous adenitis are offered, only three seem to have any real grounds, viz., the loss of protection by the glands; the difficulties of complete removal, and the danger of dissemination of the germs. Though the title of this paper includes acute adenitis as well as chronic, it is to be understood to refer only to chronic septic infections, for here as elsewhere there is no difference of opinion as to the incision of acute abscess. We encounter four forms of chronic tuberculous adenitis; the single, indurated slow-growing gland; the multiple indurated gland, without tendency to suppurate; the softened suppurating gland; and the gland with an old sinus. The course is the same, but it is modified by the powers

of resistance in the constitution. In that form of multiple gland induration, involving constantly increasing numbers, the cause is constitutional; and recurrence will be the result of operation. In the other forms, which are really stages of one type, the cause is local, and is due, doubtless, in most cases, to infection from the tonsils and adenoid growths in the naso-pharynx, and perhaps occasionally to carious teeth. Such causes are often susceptible of removal, this is followed by improvement in the glands. The pathology of this condition has recently been well described by Schleich, of Berlin (2), and is fully discussed by many authorities in current medical literature, to which reference is here made. This subject will not be considered here. In the main, it is generally accepted; but the conclusions of even so great a surgeon as Schleich are not those most commonly adopted by American surgeons. Wheaton (3) recently expressed the opinion that the protective power of the glands was not only so perfect, but so extensively and inexplicably exercised, that the removal of such a help to health was often a crime. Schleich, taking somewhat the same view and dilating upon the difficulties of the operative steps, advises a conservatism that seems almost unsurgical. Dowd (1), Morgan (4), Bentham, Robinson (4), Petit (5), and other recent authorities here noted, adopt more radical procedures, some, perhaps, going to the extreme in the opposite direction.

The lymphatic glands do undoubtedly more or less perfectly prevent the invasion of the constitution by infections. In ordinary normal conditions they effect this without becoming irritated; when, however, more work is put on them than can well be borne, swelling, redness and tenderness, indicating inflammation, supervene. With this inflammation, the function becomes interfered with or perhaps destroyed. If, perchance the invading poison is not too virulent, Nature may correct the inflammation by resolution. If it is virulent—acute or chronic—not only will that gland and other neighboring glands be rendered "hors de combat," but the invading poison will advance beyond them, and leave them, not only useless to protect, but themselves disseminators of poison, thus helping

to keep up the constitutional trouble. If the virus is chronic in character, this influence, though pursuing the same channels, will be slower and less depressing, but the analogy is the same.

Professor Schleich states that he was led to give his views and experience with relation to the treatment of this condition because of the absence of satisfactory data as to the surgical treatment. It does not seem, however, that the conclusions he reaches are approved by the present surgical opinion in this country; hence the subject offers a field for investigation. Granted that in the healthy state the lymphatic glands filter and modify virus, and protect the constitution—that once removed the protection is often partially, and sometimes wholly, lost—that elephantiasis sometimes succeeds the removal of lymph ganglia—that complete removal is sometimes difficult or indeed impossible—that death may occasionally follow the operation—and lastly—perhaps the only important objection, that there may follow dissemination of the poison; let us for a moment consider the rational answers.

It is well known that all functionating glands in the body act, not only in support of each other, but often vicariously. The loss of a kidney is promptly made up for by its fellow; the establishment of collateral circulation after the obliteration of an artery is but the work of a few days in preventing gangrene of an extremity; disabled ducts and whole groups of damaged muscles are compensated for by able substitutes. Not only is it rational to expect the remaining countless glands and lymph radicles to take the duty of their perished comrades, but Nature here as elsewhere will provide a new protection where the old is destroyed. Hence, a hopelessly damaged, threatening, infected lymphatic extirpated is a good riddance, and no good surgeon in either Germany or the United States, or elsewhere, would hesitate a moment if he could extirpate the structure totally by *wishing* it out. The gynæcologist of the present era, even in the face of death, advocates the extirpation of intra-abdominal glands though only threatened with malignant invasion.

The occurrence of swelling of the lymph tracts and pseudo

elephantiasis is, perhaps, an occasional sequence of the removal of axillary glands—never of cervical—but it must be very rare that it does not get well in a few months, and it cannot well follow any but very extensive resection for cancers or lymphadenoma, either of them eventually fatal if undisturbed.

The difficulties of the operation in competent hands are not usually considerable and are never insurmountable; though frequently it may not be feasible to extirpate the capsule entirely. With regard to the dissemination of disease, it happens here no more frequently than with sarcoma and carcinoma. Ask the genito-urinary surgeon how he treats inflamed chancroidal buboes, and ascertain how little he fears dissemination. The operation done hastily with forcible enucleation and detachment may at times press the contents of the still intact gland into the proximal ducts, but careful and deliberate dissection and separation will not tend to disseminate the virus.

These are the reasons offered by the objectors to radical operations, and they lie with force only against unnecessary ones.

We have seen that the multiple lymphoma, where from a dozen to hundreds of glands are to be found, is the manifestation of a constitutional infection already beyond the aid of the glands, and hence to be benefited by surgery only when the glands themselves are a source of great distress from their size and numbers pressing on the structures. Suppuration is rare in this form. This is often the early manifestation of lymphadenoma.

The single hard-growing and non-suppurating gland indicates the partial effort to restrain an invading poison. It may enlarge gradually or suppurate later, but often it remains stationary without pain or suppuration, and only demands surgical intervention when, by pressure from increasing size or from disintegration, it becomes a menace.

The inflamed single gland, or perhaps group of two or three glands, which appears often in seeming health in childhood and early adolescence, with redness and some tenderness, and even at times painful, and which in a few weeks shows fluc-

tuation from circumglandular suppuration, is, nine times out of ten, hopelessly damaged, and will, if not removed, gradually soften and be got rid of after weeks or months, or maybe years, of discharge. In their later stage, these glands constitute the fourth form in which we see this troublesome affection.

Why such a condition should be temporized with, why it should be washed out with peroxide of hydrogen, or poulticed, or bandaged up with salves, is not a question to be asked of scientific surgery, nor is a curettement to be substituted for an early removal, as complete as is possible in the surroundings.

How, then, shall these conditions be treated? Medical and expectant methods apply to the non-suppurating and non-progressive states, until, either because of the discomfort or for esthetic reasons, surgery is invoked. This treatment, besides the ordinary constitutional measures, may include the administration of mercury as well as of potassium iodide, both highly recommended by Schleich. Local applications of moderately simulating ointments or paints serve a moral as well as a physiological purpose. The internal administration of iodine and hydriodic acid are among the valuable special agents. Warmth and protection are of great value.. Iodoform injections into the gland and circumglandular structure are advocated by Hammerschlag (7). This plan of treatment may be safely continued until caseation or suppuration ensues. When this occurs, the gland is hopelessly damaged, and, besides, it is a source of infection. Under such circumstances shall it be excised, with or without curettement, enucleated, or extirpated? Incision gives a tardy, incomplete recovery, a long treatment with constant dressing and an ugly cicatrix; curettement aids in a prompter repair, but the convalescence is still a tedious one and some of the glands come away with suppuration. Enucleation, appropriate for the non-softened glands, is to be substituted after suppuration for complete extirpation, only when the latter cannot be completed. In all these steps I believe the danger of dissemination is less in complete extirpation.

True, it is not always possible to resect all the capsule, and an extirpation may result in a final curettement, but, commonly,

care and patience will enable the surgeon to remove all the glands, close up the wound with a small drain and promptly restore the patient to health. Usually, after this operation the general health will astonishingly improve, and the patient will take on flesh. Recurrence, when it is observed, is due, not usually to dissemination, but to the original cause, which, when possible, should be removed prior to any other treatment.

We conclude then, that

1. The cause of tuberculous adenitis of the cervical region is almost always local, and takes place through the buccal cavity.

2. The glandular manifestation, when it progresses, and especially when it is followed by suppuration, indicates a damaged and usually useless, often dangerous, gland.

3. The removal of such a gland *in toto* and promptly is neither difficult nor dangerous, and is the treatment indicated.

4. Nature will probably provide a new and equally perfect protection in the stead of the one that is lost.

5. Multiple enlarged glands indicate a constitutional tendency which will not be benefited by removal, except when local discomforts indicate it.

6. Small groups or single slowly growing glands are subject to the same indication.

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DISCUSSION.

DR. CHARLES F. MCGAHAN, of Aiken, South Carolina.—I agree with Dr. Grant that the extirpation of tubercular glands is the only course to pursue, but I would go a little further than he does by stating that as soon as we observe inflammation of these glands, it is the safest thing for the patient, as well as satisfactory for the surgeon, to extirpate them. In my practice I see a great many cases of tuberculosis of the lung, and if there

is any one thing that I dislike to see, it is an inflamed lymphatic gland. Extirpation should be the method of procedure in such cases. Without extirpation the cases may improve for two or three months, but the first thing we know the glands are breaking out again, and while the patient may go on improving in every other respect, he or she, as the case may be, will not be cured until the glands are removed. I recall the case of a man who had tuberculosis in the apex of one lung. He recovered from this and gained several pounds in weight. He was fifty years of age. He has now developed tubercular glands, although he has not lost in weight. A physician treated him by the absorbent method. When I saw him I recommended extirpation of the glands. I am firmly convinced that when once these glands become involved in tuberculosis, the only thing for us to do is to perform extirpation. While I enjoyed the paper of Dr. Grant very much, I do not think he laid sufficient stress upon complete extirpation of tuberculous glands.

DR. J. HOLINGER, of Chicago.—It is very essential to remove tuberculous glands of the neck, but physicians rarely think of the source of infection. They hardly ever look to the nose, the throat, or the tonsils as the seat of infection. It is comparatively common to see a surgeon remove the glands of the throat in a child, but he overlooks the occlusion of the nose with large adenoids which can be seen in the month; also enlarged and perhaps tuberculous tonsils. I believe we would obtain quicker and better results if we ascertained the primary cause.

DR. CHARLES A. WHEATON, of St. Paul, Minnesota.—I did not intend to discuss the paper of Dr. Grant, but I rise principally to speak of one or two points that have been brought out. I read a paper on this subject a little while ago. I think the title of it was "The Lymph Node as a Factor in Diagnosis." I believe it was in the third conclusion of the Doctor's paper that he referred to the removal of infected lymphatic glands. I do not know of any of the modern surgical fads which has brought so much opprobrium to the surgical profession as the indiscriminate removal of cervical glands, except perhaps the indiscriminate emasculation of women. I think it has proven to be one of the greatest abuses of modern surgery. During the evolutionary period of boyhood or girlhood, or during the period of

life after the fortieth milestone is passed, when our structures are undergoing degenerative processes, naturally we expect malignancy in the aged, and tuberculosis in the child. But there is not a physician present here to-day of ten or fifteen years' experience who cannot recall case after case, many of them hundreds of cases, that have recovered under the sole, timely, domestic use of syrup of iodide of iron, cod liver oil, and proper hygiene. These glands undergo evolutionary irritation in consequence of the evolution of the body, and patients are made to forget the use of the surgeon's knife where the glands are absolutely benign. There may have been infection through the stomata, through the larynx, and naso-pharynx, but the vast majority of these patients get well without any surgery. It does not matter very much to those of us of the male persuasion whether our necks are scarred or not, but it means a great deal to the girl whether she is mutilated or not, and Dr. Grant, I think, will bear me out in the statement that a large percentage of these patients with proper hygienic surroundings, proper care, with medicine internally, will get well without the use of the knife. I must therefore utter a protest against the indiscriminate use of the knife for all enlarged lymph nodes in the neck.

Dr. Dudley S. Reynolds, of Louisville, Kentucky.—I have had some experience in the treatment of enlarged glands of the neck, and have seen the mutilations to which reference has been made by the essayist and the last speaker (Dr. Wheaton). I have seen the evils of the indiscriminate use of the knife. I have noted likewise that in very many cases where the glands were accessible to the touch or pressure with the fingers, that massage, with constitutional treatment, not with the syrup of iodide of iron and cod liver oil, but eliminating agents and the exclusion of all types of glucose food. For a child of six to ten years of age the treatment should be Bichloride of Mercury, 1-50 grain, with 1-10 grain of Sulphate of Quinine, every two hours; outdoor exercise, and a good bath every evening. Where the glands are so situated as to permit massage, recovery will often take place in ten to twelve days. The only constitutional treatment to be thought of in such cases should be that which is best calculated to dissolve accumulations in the lymphatic glands, and at the same time stimulate the eliminating organs. Children under fifteen years of age should be required to take from two to four ounces of water with each dose of medicine. From fifteen years of age upward the

quantity of water with each dose of medicine should not be less than eight ounces. Very few people drink sufficient water, and if you take pains to insist that, with each dose of medicine the patient shall drink one glass tumblerful of pure water, you will secure the introduction into the blood current of one-half pint of water every two hours during the day. This alone, with total abstinence from all the glucose types of food, will often suffice for a cure. The fact is, nobody drinks too much pure water.

DR. A. P. BUCHMAN, of Fort Wayne, Indiana.—I was very greatly interested in the paper of Dr. Grant, particularly so because of a case that fell under my observation within the past year. The inclination of a rather rash youth to be known among his clientele as a surgeon induced him to operate upon and remove a few recently swollen cervical glands in the person of a rather delicate young lady, upon the presumption that they were tubercular. The shock of the operation, the necessary close housing of the patient, the digestion reduced below normal, rendered her non-resistant and the result was an inevitable general tuberculosis.

And now this raises a point in connection with the cases recited by Dr. McGahan: The sanitarium methods he uses are, I believe, based upon rational and sensible grounds. Food, air and exercise are the weapons with which he combats tuberculosis. His patient went home too soon, he went into the house, slept in an illy ventilated room, ate badly prepared food, in short, put into active operation every causative factor to bring about a return of his host, the tubercle bacillis. It is not in evidence at all that people take consumption out of doors; it is essentially a house disease, and to surgically remove a few tubercular glands here or there about the body is only to get rid of that particular focus of irritation; it cannot be dignified as a curative measure. The tubercle bacillis is a delicate little thing, a little bit of sunlight and it is gone; it requires a long time and benign conditions for it to kill a human being, and in this fact may we not get a hint as to a possible method of cure? My experience is that a tubercular patient can be more easily over than under fed. I have adopted the plan of feeding but once in twenty-four hours. In the interim I prescribe large quantities of sterilized water and keep them out of doors. They soon lose their abnormal appetite, settle down to the one meal a day and I assure you, gentlemen, a trial of this plan intelligently applied will convince you of its value.

DR. GRANT, (closing the discussion).—I have very little more to add, except to remark that the discussion indicates the same need for data as to the treatment of enlarged cervical glands that I indicated in my paper. In other words, there does not seem to be a clear understanding on our part as to the conditions that require surgical intervention. I am entirely in accord with the views of every gentleman who has discussed this subject. But one point I endeavored to bring out was not discussed by any member of the Association, and that was which one of these glands demanded enucleation, except Dr. McGahan, who indicated an extreme disposition to resort to surgery in these cases, and he went a little further than I was disposed to go. I distinctly stated that multiple glands which did not suppurate, or which would not be benefited by any kind of surgery, and which were due to constitutional trouble, were not much of a menace and should be treated by medicinal means. Whenever these glands are softened and break down they constitute an ugly trouble to the neck, and make a greater and more unsightly scar than is made by the surgeon in removing these enlarged glands. Such glands are not only useless and cannot be repaired, but they are a menace in themselves, and it is unsurgical, not to say cowardly, to hesitate to remove them. The same holds true where a sinus exists.

XI.—A CASE OF INTERMITTENT HYDROPS OF THE KNEE.

BY GEORGE W. CALE, JR., M. D., F. R. M. S.

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Among the most important joint diseases with which we have to deal is one but rarely seen, which is known as genu hydrops intermittens. In this disease the swellings may occur at regular or irregular intervals the principal symptom of which is a watery effusion, usually in one or both knee joints. This affects otherwise healthy persons, without any injury or known cause. One writer has classed it under the head of inflammation accompanied with abundant serous effusion, but as there is usually no pain and never any redness or rise of temperature, I believe we should look for some other pathology than inflammation of the synovial membrane. While in very

rare cases there is severe pain in the joint, this is the exception. The effusion usually appears rapidly, remains but a short time and becomes gradually absorbed. But in some cases before the exudate has entirely disappeared the patient has a new attack, and thus, new exudates being added to the old, it is some times years before all have disappeared entirely. A period of rest of several years may then ensue, when the old regime will be taken up again.

Schuchardt reports a case of a lieutenant who was attacked by a gradually increasing pain in the left knee joint. No cause could be assigned for this, which was especially marked when the limb was kept in a fixed position for any length of time. This occurred in July, 1886. The swelling then appeared at intervals of eight to fourteen days with pain, but without any interference with his general health. From August to the middle of September he employed the water treatment in Wiesbaden, but without success. From that time on the swelling appeared every eight days, without pain. In the intervals effusions disappeared entirely. The first of January, 1887, the expected swelling did not appear, but on the 12th it appeared and the knee joint was tapped and washed out with an antiseptic solution. The contents of the joint were a clear serous liquid, with a few flakes of coagulated fibrin and small cells from the synovial membrane. Micro-organisms could neither be demonstrated by staining nor by cultures from the exudate. After the operation the swelling did not appear until the following fall. About Christmats, 1887, the patient, after straining his knee while hunting, had a very rapid and large effusion. It disappeared without treatment, but gradually periodical swellings came again, although not so severe as formerly. During the summer and fall of 1888 everything disappeared and he continued to go about without inconvenience, with one exception. He awoke one morning with a large swelling of the knee, but remaining in bed during the day he was able to walk about and attend the theater that night. The next day all of the effusion had disappeared. There was no apparent cause for this attack. During the fall

of 1889 there were no more attacks. From then on at intervals of eleven days light attacks occurred. In March they became more severe, and the knee was two centimeters larger than the healthy one, and with pain radiating to the calf. The patient was then put upon drachm doses of iodide of potash, and after using this for a short time the effusion disappeared. It may be of interest to know that this patient had a brother, a stout, well built student of 18 years of age, who suffered for two years with vasomotor neurosis.

The following is a case that came under my personal observation last winter.

Patient, a lady, of about 41 years of age; married; no children; previous history good. No tuberculosis in family and no history of rheumatism or syphilis. The first attack occurred in the summer of 1894. No history of an injury. Patient first noticed that the knee joint cracked a little on motion and began to swell, when in three days the swelling was quite marked, this being evidently an accumulation of synovial fluid. There was no rise in temperature, no pain, no discoloration; the knee joint, of course, being somewhat stiff on account of the distension. At that time the patient's knee was bandaged with flannel and she was treated for rheumatism. This attack lasted about five weeks, when the fluid disappeared and she was apparently well until the summer of 1897, when she had a similar attack, which lasted her from three to four weeks. The third attack occurred in July, 1898. This attack was different from the first two, in that the accumulation in the knee joint was not so marked, and would almost disappear and then in a few days reappear. She did not get well this time for about six weeks. The fourth attack, the one in which I saw her, occurred in January and February, 1900. The patient's left knee was apparently dry from the cracking sensation on motion, and after a few days began to swell up, the accumulation being, as usual, synovial fluid. There was no pain, no redness, no rise of temperature; in fact, none of the signs of inflammation present except the swelling. I put the limb in a plaster of Paris dressing, and while the usual signs of rheumatic arthritis were not present I thought it would do the patient no harm to give her salicylates. This was done, but there was no good effect from their administration. The iodides were next given, with negative results. After eight days' rest, with the limb in plaster, the accumulation disappeared almost entirely, but upon remov-

ing the bandage it reappeared. This occurred five times at intervals of eight days, and finally the patient decided to go to Hot Springs, where she remained three or four weeks. There she took the baths, was placed on a rigid anti-rheumatic diet, and given the usual anti-rheumatic treatment, all of which did absolutely no good. During her stay at the Springs her attacks occurred with the usual periodicity, but were not quite so severe. When she returned to me by the first of March I decided to give her arsenic, on the theory that the condition was, as far as I could tell, a neurosis. In less than three weeks after beginning with arsenic (Fowler's Solution) the swelling had all disappeared, and up to the present time there has been no indication of a recurrence of the trouble.

This disease seems to be more prevalent in women than in men. Eschricht collected reports of 18 cases, 12 of which were in women, 4 in men, 2 sex not given. It occurs principally in adults, only one case, that of a nine-year-old girl, reported by Pierson, having occurred in a child. The disease has never been seen in old people. The duration of the disease varies greatly. Von Grandidier reports a case which was cured after a few months, while Seligmueller mentions a case that was cured only after an existence of twenty-five years.

The disease is peculiar in the following way; for instance, one patient will have attacks which occur every eight days, another patient will have attacks which occur every eleven days, some every thirteen days, some every four weeks, and some every three months, the intervals between attacks in each case being the same; that is, in any individual case we very rarely see any irregularity in the time of recurrence. A peculiarity of the disease is the disappearance of all symptoms during pregnancy. Loewanthal mentions a case of a twenty-eight-year-old women who had the disease for some time, which recurred every twelve days, but was free during the entire pregnancy. Panos reports a case in which the symptoms disappeared from the beginning of the pregnancy to the fourth month, when a miscarriage took place and the disease immediately recurred.

The knee joint seems to be the most often attacked. In the 18 cases mentioned by Eschricht 16 were in the knee joints.

Other joints effected are usually the elbow, wrist and hip joints.

In looking up this subject I find no mention of it in any of the American text books at my disposal. Koenig's Surgery, last edition, gives about twelve lines to the subject, simply stating that the disease exists, and calling it a neurosis. Schuchardt, in a monograph on Hydrarthrosis, takes up the subject of hydarthrus intermittens and mentions several cases, his conclusions being that it is a neurosis. I am informed that the disease is considered a neurosis by Bergman. Rosenbach considers this trouble a variety of sub-acute joint rheumatism. He claims that because salicylates are not effective there is no reason to consider it not rheumatism, as we know that sometimes salicylates have no effect upon rheumatic patients. Schuchardt thinks the periodical swellings would be easily explained if we could find the schizomycetes in the membrane or effusion; which germ concludes its involution in 14 days, and which, therefore, might be responsible for the swelling. From other pathologists who have given attention to the disease we are led to believe that it is due to a vasomotor neurosis. While it may be easy to understand how an effusion can take place into a joint on account of the dilatation of the vessels of the synovial membrane, it is not easy to understand the equally sudden disappearance of the effusion. It has been suggested by Brodie that the disease be placed in the same category as hives, which come and disappear so suddenly.

The questions that most interest us, of course, are its etiology and pathology. I think we are all agreed that intermittent joint swellings are either due to infections or nervous causes. It is possible that the cause may be an infection of some microorganism, whose development and life period extends over a time the same as that of the disease, and that the exacerbations correspond to the period of activity of the life of the germ. In all cases where the joint membrane has been examined no pathological change has been found. While the disease is classed by some as a joint neurosis we must not forget that there is a striking disproportion in the severity and the symptoms of this trouble and a typical case of articular neurosis, the

principal symptom of the latter being pain, while in intermittent hydrops pain is almost never experienced. Still we can only surmise that the rapid accumulation of fluid in the joint is due to the nervous control over the blood vessels of the joint membranes, which vessels are certainly the source of the fluid accumulations.

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DISCUSSION.

DR. EDWARD W. LEE, of St. Louis, Missouri.—I believe we would be justified in considering hydrops of the knee joint at times a vicarious condition; or, we may have an inflammation, a congestion, or effusion into the knee joint due to a vicarious condition. As it occurs in women, and is oftentimes due to suppression of the menstrual flow, and making its appearance in other directions, I believe the condition can be reasonably considered a vicarious one. This condition brings up another question, namely, to distinguish it from traumatism. Very often it is attributed to traumatism, when in reality traumatism has not taken place. A good deal of attention should be given to the subject in order to differentiate hydrops from that which is produced by actual traumatism.

DR. HAROLD N. MOYER, of Chicago.—This case is interesting on account of its rarity; it has been recognized for at least twenty years, and various theories respecting it have obtained; that it is of nervous origin is perhaps the most common. When we study the histories of the cases reported, we find there is a deplorable deficiency in them; that is, the general condition of the patient is singularly omitted. There is a lack of investigation of the nervous system as a whole, and of the constitutional states and of the blood. In the history of the case which the Doctor has detailed there is a striking absence of some of the essentials often associated with this disease. The condi-

tion is rare. I do not recall having seen a case of it myself, and I have had fairly wide opportunities of seeing nervous affections. I have never been able to identify a joint trouble that was not due either to trophic changes or to traumatism. We simply beg the question when we attempt to assign any definite cause. It may be nervous; indeed, it has the earmarks of a nervous trouble. Intermittent hydrops of the knee joint is of uncertain pathology and etiology, notwithstanding that much has been written on the subject.

DR. CALE (closing the discussion).—I took occasion to ask a friend who had visited several of the European clinics this summer about this class of cases, and he told me that in the clinic of von Bergmann they had eight or ten cases a year. The acute or first attacks are treated by rest, and in the subsequent attacks they resort to massage and give arsenic. I believe it is the latter that does the good. Bergmann is one of several who classes the disease as a neurosis.

XII.—PERFECT RECOVERY FOLLOWING GANGRENE OF THE SCROTUM AND PENIS.

BY EVERARD HAMILTON RICHARDSON, M. D.

ATLANTA, GA.

Because of its being unique—certainly cases of this character do not very frequently come under the observation of the physician and surgeon of the widest experience and having the largest clientele—this case is reported. It is of exceeding interest to myself and I indulge the hope that it may prove not less so to this august body of practitioners of medicine and surgery.

E. H. T., occupation bank cashier, native of Georgia, now a resident of Sanford, Fla., personal and family history most excellent, was treated there by several eminent and most excellent physicians and surgeons; came to me direct from the Plant System Railroad Hospital, located at Sanford, Florida. Sum-

moned by wire on June 8, 1900, I met this patient at the Union Depot at Atlanta, Ga., and found him in a Pullman sleeper almost in a state of collapse, with a pulse of 120 beats per minute, temperature 103 F., and bathed in a profuse perspiration from exhaustion.

I immediately administered one-thirtieth of a grain of strychnia hypodermatically, gave him a drink of brandy and placed him in the Grady Hospital ambulance, sending him to St. Joseph Infirmary. There, from the patient himself and his friends, the following clinical history of the case from its inception was obtained: Upon the sixteenth day of May, 1900, the patient observed a small pimple upon the integument a short distance above the *os pubis* which was slightly red; shortly afterward the surrounding tissues became swollen and somewhat tender to the touch. In twelve hours from the date of the appearance of this apparently insignificant pimple the inflammation extended to the penis, where in addition to the general swelling and redness then obtaining there was intense itching and burning in the affected parts. The pain at no time was severe, but the burning and itching was great. At this juncture, forty-eight hours from the appearance of the initial lesion, the penis turned black and simultaneously the scrotum became involved, which a few hours later also turned dark, and the physicians in attendance denominated the malady gangrene. The patient was now placed under an anesthetic and the necrotic structures were removed by the surgeons in charge of the hospital.

An examination of this patient after coming into my charge revealed the fact that the integument of the penis had been entirely destroyed, the destructive process extending down to the *corpora cavernosa* and the *corpus spongiosum*. The *crura* and suspensory ligaments of the root of the penis were intact and the *glans penis* had escaped, as the line of invasion did not extend beyond the *corona glandis*. Three-fourths of the scrotum had been entirely destroyed by the gangrenous process down to the *tunica vaginalis*. The spermatic cords, the testes with the epididymis, were in good condition, but the testes were entirely bare of covering and were supported only by the spermatic cords.

The penis and testes were thoroughly cleansed with a solution of mecuric chloride 1-3,000, enveloped in 10 per cent. iodoform gauze, rubber tissue, absorbent cotton and a double spica bandage was applied. Constitutionally he was supported by the regular administration of sweet milk, beef juice, raw eggs, and the liquid peptonoids. He was also placed upon Squibb's

tincture of chloride of iron, and strychnia with tonic doses of quinia were continued. Antiseptic dressings with the addition of Marchand's dioxide of hydrogen in full strength and a twenty-five per cent. solution of balsam of Peru in olive oil were continued daily. There was very grave impairment of the patient's nutrition, emaciation was extreme, and the patient was but little more than skin and bones. His general condition was such at this time as to preclude the propriety of considering any operative procedure. From day to day it was difficult to discern any improvement, but under the regime instituted the patient's appetite and strength slowly improved. The necrotic or gangrenous process ceased its havoc and the line of demarkation was clearly established. But not until the lapse of twenty-six days from the time he came under my observation did I believe it safe to risk his survival of the shock of operative interference. For good reasons he was removed from St. Joseph Infirmary to a private house.

At my instance, on July 2nd, 1900, my distinguished friend and that most skilful surgeon, Dr. W. F. Westmoreland, was called in to see this case with me. It did not seem possible that there was left a sufficient amount of the scrotum for an adequate covering for the left testicle. We decided, however, to make the attempt to save both testicles. I regret that owing to a hurried call from the city Dr. Westmoreland did not again see the case after his first visit until the completion of the operation, when the patient presented himself at his office only to show a perfect specimen of restored manhood.

On July 4th, assisted by my son, medical student Everard Dugas Richardson and by Dr. Pierce M. Butler, who administered the anesthetic, I dissected the scrotum as high up as possible, using strict antiseptic precautions, and succeeded by pushing up the testes and introducing silk worm gut sutures and pulling down the scrotum in entirely covering both testes with integument. A small piece of gauze for drainage was left in the center of the wound, with the exception at this point perfect union was secured by first intention.

The patient was slow in regaining his wonted strength, but at this writing, September 1st, his recovery is complete. October first he is a splendid specimen of physical manhood, strong and robust.

General Remarks.—Before giving my conclusions concerning this case, I wish to state that from my own long and intimate knowledge of the family history, morals and habits of

this patient I am able absolutely to exclude the suspicion of any venereal taint as a causative factor in its production. The patient's perfect recovery, his present superb health, warrant the elimination of *arterio-sclerosis, atheroma, chronic nephritis, diabetes mellitus* as etiological factors in the production of the case of gangrene under consideration. The history of this case does not justify the assumption that the gangrene was due to any obstruction of the circulation or on account of the intensity of the inflammation, because at no time did the inflammatory process run high. We are also able to exclude *embolism* and *thrombosis.*

It is well known that there are varous causes of gangrene and that there are various micro-organisms that may be concerned in its production, and it is true that no specific germ producing gangrene has yet been discovered, though I believe its discovery will be made by bacteriologists in the future.

Reviewing the history of this case from its inception and instituting a careful analysis of the symptoms seriatim as they occurred I conclude that: The initiatory cause in this case was an abrasion of the skin at the spot where the small pimple first appeared. This was the portal of entrance of the pathogenic bacilli, the *streptococcus erysipelatis* from which infection occurred. Later there occurred a second infection from the *cocci* of gangrene, rather than a terminal phenomenon of erysipelas.

Fehleison teaches us that the *streptococcus erysipelatis* presents distinct differences from the *streptococcus pyogenes* and that we never have suppuration in erysipelas except from a mixed infection.

That distinguished pathologist, Dr. William H. Welch, has recently contributed a most admirable article to the transactions of the Massachusetts Medical Society, showing a collection of forty-six cases of *emphysematous* gangrene, in all of which the *bacillus aerogenes capsulatus* was demonstrated to have been present.

To me it is a matter of profound regret that no bacteriological examinations were made in the case under consideration. I

also lament that I did not have photographs taken in order to demonstrate the local destruction of this patient's genito-urinary apparatus, as well as to portray the perfect recovery after the performance of the simple operation which I have narrated.

XIII.—SOME OBSERVATIONS GLEANED FROM RECENT CASES OF MASTOIDITIS.

BY GEO. F. KEIPER, A. M., M. D.

LAFAYETTE, INDIANA.

CASE 1.—Dr. J. S., æt. seventy-four, was first seen June 26th at his home. Right mastoid very tender to touch, no discharge from ear. Punctured the drum, but got very little pus. Temperature, 99 degrees; pulse, 80. The ordinary treatment was ordered. He did well until June 28th. At the regular visit made at noon he seemed to be in fair condition. At 7 p. m. his son, Dr. F. S., telephoned that his father's temperature had gone up to 102 degrees, and that his pulse was 80. Taking Dr. Webster of our city with me, we drove to his home immediately. From the observations made we diagnosed septic absorption, and the possibility of an operation was stated. We determined to wait until the next day for further symptoms. We were gratified to find his temperature was normal at 10 a. m. the next day, and his pulse was 80. The tenderness over the mastoid was gone. From this on he steadily improved and recovered his wonted health and hearing. What nature did for him was to take up the pus by the lymphatics and mastoid veins, pass it through the lateral sinus, doubtless, thence into the general circulation and out of the body through the emunctories.

CASE 2.—Charles G., æt. thirty-two; cook at Indiana State Soldiers' Home. This case has been reported in the *Stylus, Charlotte Medical Journal, and American Practitioner and News.* He had double mastoiditis which had been in existence three weeks when he called in Dr. E. C. Davidson, who recognized the condition promptly. He explained to him the gravity

of his condition. The writer was called in consultation and verified the diagnosis and concurred in the doctor's opinion concerning the gravity of his condition. Operation was made the next day at St. Elizabeth Hospital. Both mastoids were cleaned out of all dead bone, pus, and cholesteatomata. Surgical erysipelas followed, which was relieved by the application of pure ichthyol to the face and the depths of the wound. Tincture chloride of iron was given internally in maximum doses. He made a steady recovery, and is now back at his work. Facial paralysis developed in this case, due to packing the right wound too tightly. Repacking the wound gently and lightly promptly relieved the condition.

CASE 3.—Daniel S., æt, sixty-five, of Sheldon, Illinois. He was referred By Dr. Ethan Allen, April 25, 1900. Had the *grippe* seven or eight years ago. He had mastoiditis on the right side then, and each spring since then has had a recurrence of the trouble. The mastoid process was very tender, patient exhibiting in his face the extreme suffering which he was enduring. Operation was advised. The advice was accepted. Assisted by Drs. White, Throckmorton, Bitting, Miller, Beasley, and Allen, we opened the right mastoid. We found the bone to be the consistency of ivory. Progress toward the antrum was very slow and tedious. With chisel and mallet we could only chip off small shavings of bone. However prolonged the operation was, he rallied well and made a steady recovery, having suffered no pain since the operation.

CASE 4.—John S., æt. sixteen, of this city, referred by Dr. Westfall, and seen May 7th. Condition of patient very bad. The teeth covered with sordes and the tongue with a heavy, dark-brown coat. The left mastoid was tender. Dr. Westfall had been advising an operation for a month, but every time he mentioned operation his advice was declined until the above date, when he was brought to St. Elizabeth Hospital. The patient's mind was clear. After examining the case with Dr. Westfall we concluded that his only hope lay in an operation of opening the mastoid and, possibly, cranial cavity. To this consent was given, and he was taken to the operating room

and prepared for the operation. The usual preparations were made. When the trephine was applied to the bone and given a few turns, pus of the most stinking odor welled up from the hole made by the pin of the trephine as well as from the margins of the button of bone. The odor was intensely sickening. We found all the mastoid process necrosed, and opened the bone as well as the brain cavity backward to the lateral sinus. The latter was occluded. It was curetted until blood flowed freely. The brain tissue as well as the coverings was necrotic. We finished the operation, evacuating a small superficial brain abcess. No other abscesses could be found after thoroughly exploring the substance of the brain, using a hypodermic syringe with a long needle. Considering the hopelessness of the case, he rallied well. The temperature fell from 104 degrees to 98 degrees at 1 p. m. The pulse was 94, and fairly good. As it is the intention of the paper to call attention to striking conditions, we will pass by all details to describe the odor of the pus and how we rid ourselves and him of the odor. In passing, the writer desires to add that the case will be reported in detail hereafter in another paper. On account of the intense odor, it became necessary to dress the head every four hours day and night. All means used to control the odor failed, until conversing with Dr. Adah McMahon, she told how she had used a mixture of equal parts of oil of eucalyptus and camphor in a case of cancer, which controlled the odor beautifully. This suggestion was immediately tried on our patient, and we were gratified to find it successful in controlling the horrible odor.

At 9 o'clock the next evening, having reacted so badly, he was again put on the operating table, the wound reopened and examined; necrotic brain tissue was removed, and the wound well irrigated, dried and dressed. We found the dura-mater loose from the bone for a distance of two inches from the opening as far around as we could gently pass a probe. At times we injected per rectum the normal saline solution with no effect. We then injected it through the skin of the chest and abdomen. Wherever thus injected necrosis of the skin

immediately followed. Antistreptococcus serum was tried, but with no marked effect. Nothing did him any good. He thus lingered until May 13, when he died at 5 p. m. He had been in a semi-comatose condition since 10 o'clock in the morning. The family refused a post-mortem examination.

The aim of the paper, as previously stated, has been to briefly bring out a few of the interesting features of each case. Each one possesses sufficient of interest to warrant writing a paper upon it with such comments as may be of value to those who operate thus. Brevity has been the attempt, and hence the reader is referred to the text-books for such details of operation and treatment as are here omitted.

XIV.—MIDDLE EAR DISEASES IN ITS RELATIONSHIP TO THE CRANIAL CAVITY.

BY OTTO J. STEIN, M. D.

CHICAGO, ILL.

In the entire human economy there is not a single cavity which occupies and is of such vital relative importance to its neighboring structures as that of the middle ear. It bears such important relationship to all which lies about, hidden away, as it is, deep down in the firmest and hardest bone of the body, that oftentimes it is the very thread from which suspends the sword of Damocles.

Disease in this region means not only deafness, noises in the head, discharge and dizziness, but when not properly recognized and taken in hand results in invasion of the cranial cavity and perhaps death. The very fact that it is a small cavity, not readily visible, and tucked away in so strongly fortified a position that when disease runs riot within its walls it lays the entire adjacent territory open to infection and invasion, are reasons why more study, more careful analysis and sober consideration should be given to any sign or symptom pertaining to the ear. Only a few years ago the profession was taught to disregard a chronic discharge from the ear, with

the admonition that to check it would be dangerous; therefore, to let it alone to take care of itself. This idea of the subject took its origin, presumably, from the fact that many cases attended by spontaneous cessation of the discharge became worse and died. As a result of this teaching, the laity came to regard a running ear as a most natural state of affairs, which to interfere with or check by any means, would tend only to complicate matters. Formerly patients had to be satisfied with such advice from their physician because of an undeveloped state of the profession's knowledge, but the day of such ignorance and omission is past. A patient suffering from a suppurative affection of the ear demands a more absolute statement as to his condition, and is entitled to a clear exposition as to the real dangers he is living under. Any other advice stamps his adviser as a man of antiquated ideas, non-progressive and of limited ability. Your patient is a more educated man than he was a few years ago, and if you, as his medical adviser, have not kept pace with the march of progress, he has. His taste for the mysteries of scientific subjects has been whetted by an ambitious secular press, by the teachings of the departments for scientific research opened up by our colleges and universities, and by the natural evolution for more searching thought by an enlightened public.

It has very pertinently been said that "a man with purulent middle ear disease has a charge of dynamite at the base of his brain, which is liable to explode at any time." To confirm the truth of this statement, we have but to look over the various causes of brain infection and abscesses, when we notice that, next to trauma, ear disease is responsible for the greater number of such conditions. Nowadays, with our more perfect understanding of the pathology of these conditions and the thoroughness to which antisepsis and asepsis may be applied, we find it to the salvation of our patient to enter the cranial cavity with the same fearlessness that the surgeon enters the abdomen in cases of strangulated hernia, appendicitis and gunshot wounds. Our first and all-time duty is to place every suppurating middle ear trouble on the list of serious diseases; and

the longer it exists the more serious it becomes. When you have this fact thoroughly imbedded and firmly fixed within your mind, then you are in a position to recognize the symptoms resulting from its entrance into the cranial cavity, and not call it a case of typhoid fever, malarial fever or tuberculosis, as is constantly being done. Cases have again and again been reported where sudden death has resulted and where the autopsy has demonstrated a brain abscess as the cause resulting from a chronic ear disease.

Middle ear disease is a much more common affection than it is ever thought to be, and occurs in many cases where it was never suspected. Especially is this true of infants and children. Ponfick, who performed one hundred autopsies on children, found only nine normal ears. Of all the remaining cases only in ten had an ear trouble been diagnosed. The mortality rate from intra-cranial complication resulting from ear disease, as found in nine thousand autopsies from all causes by Newton Pitt, at Guy's Hospital, in London, was two-thirds of one per cent., or fifty-seven cases. Gruber found, out of forty thousand autopsies, two hundred and thirty-two cases. As to the age, sex and side of head where lesion appears, the different observers hold divers opinions. The male, on account of his greater liability to exposure, seems to be more often affected. The same reason may account for the more frequent occurrence in the young. But here must also be considered the undeveloped condition of many of the parts. The greater number of otitic intra-cranial complications result from the chronic variety, although the number following close upon acute cases is by no means small. Some authorities seem to deny the truth of this statement. It is said that Von Bergmann is of the opinion that brain abscess never results from an acute otitis. My perusal of literature does not seem to bear out this statement, for I find numerous such cases reported. Men like Macewen, Koerner, Schwartz, Toynbee, Meyer, Jansen, Paul Koch, and others have observed like things.

Aside from the abscess condition, we may have a phlebitis, a meningitis and the formation of sinus thrombosis, singly or in combination, following the acute or the chronic form of otitis.

Point of Entrance of the Disease into the Interior of the Cranium.—The particular site of entrance through which the invasion takes place is one of the most important matters connected with this subject. It often becomes the subject of greatest importance in seeking the exact locality of the complication; for from the knowledge of this fact one is saved a roundabout way of operating. It not only helps us to more accurately locate our trouble, but facilitates differentiating between an abscess and sinus disease. As, for instance, in case we have a necrosis involving the roof of the tympanum, we might expect as a consequence a phlebitis or thrombosis of the superior petrosal sinus, because this sinus courses along the roof of the middle ear. Under such circumstances we would not at first expect to find disease in the cerebellum. Where we can possibly exclude mastoid disease, the chances are, although not necesarily, that we have to do with trouble in the temporal region. In discussing the various avenues through which disease may enter the cranial cavity, we have but to look at the anatomical landmarks lying about the middle ear. And here, first of all, we would most naturally look along the lines where the various parts of the temporal bone articulate with one another. The petro-squamous and the squamo-mastoid sutures are the important ones. The former is distinctly seen coursing along the superior aspect of the petrous bone. It is always present during childhood, and oftentimes in the adult. Along its course is situated the petro-squamoal sinus. This sinus bears particular attention on account of the importance it plays in fetal life to the intracranial circulation. At this time, and before the formation of the jugular vein, it acts as the carrier of all the intra-cranial venous blood. Its presence can very often be made out in the adult skull, and in children it is almost always present.

Forming the roof of the middle ear we have a very thin lamina of bone, so thin that it is markedly transparent. It is called the tegmen tympani. This thin plate of bone forms at the same time part of the floor of the middle cerebral fossæ; and in cases that at times occur, where it is deficient, we have a very

ready means of entrance of the infection into the brain tissues, for in such cases nothing but the brain membranes and the mucous membrane lining the middle ear separate the two cavities. Necrosis of the roof of the middle ear is probably the most frequent means of the disease entering the skull cavity. Forming the floor of the middle ear is also a thin plate of bone which separates it from the jugular fossa, in which lies the internal juglar vein. The bone is perforated for the passage of the auricular branch of the vagus nerve, and is at times the site of dehiscences, as in J. A. Andrews' case, where the bony floor had two jugular openings, the result of arrested development. In such a case the jugular vein would lie in direct contact with the mucous membrane of the tympanum.

Part of the anterior wall of the middle ear is formed by the carotid canal, and the thin bone lying between these two cavities is perforated by minute openings for the passage of the tympanic branches of the sympathetic. Posteriorly lies the mastoid antrum and cells and the sigmoid sinus. Between the latter and the middle ear is direct vascular connection, as is also the case between the antrum and cells and the interior of the cranium by the mastoideo-petrosal canal carrying a vein to the superior petrosal sinus.

The facial canal, which courses through the tympanum along its superior posterior wall, is sometimes exposed, either in part or in its entirety.

The inner wall of the middle ear is formed by the outer plate of the petrous bone, containing the two large openings known as the oval and round windows. Hence the tympanum is separated from the labyrinth only by the membranes covering these openings. The labyrinth, as you know, has direct communication with the cranial cavity by way of the internal auditory canal.

The aqueductus vestibuli also connects the interior of the skull with the labyrinth.

From this study of the territory surrounding the middle ear, with its numerous means of communication with the cranial cavity, in one instance by way of a blood channel, in another

by way of a lymph or nerve channel, and again via a suture or dehiscence, one readily sees with what ease the brain may be complicated in all suppurative forms of otitis media, and why every such case should be considered alone, cautioning your patient of the great danger he is subjecting himself to by neglecting to have every effort exerted in removing the foci of infection that is lodged somewhere within the various crevices of his middle ear. Diseased and partly necrosed ossicles should be removed, as they interfere with proper drainage. All granulations should be curetted, and polypi snared. Masses of inspissated secretion and cholesteatomatous masses should both carefully be removed.

As to the best method to pursue in this direction we will not discuss here, as that is not strictly within the province of this paper.

In order to more easily comprehend our subject, we will discuss the complications under two main divisions: that of phlebitis and thrombosis, and pus collections.

PHLEBITIS AND SINUS THROMBOSIS.—Inflammation or occlusion by clot formation of any one or more of the numerous veins and sinuses within the cranium may follow as a complication of acute or chronic suppuration within the middle ear.

The point of entrance and the avenue followed by the infection have already been expatiated upon.

In case necrosis of the bone involves only the roof of the middle ear, we may have, on account of its location here, a phlebitis or thrombosis of the superior petrosal sinus. The superior petrosal sinus is the venous channel running along the angle formed by the superior and posterior surfaces of the petrous bone, and connects on one end with the cavernous sinus and on the other with the lateral sinus. In its course it traverses the floor of the middle cerebral fossæ or that part forming the roof of the middle ear and antrum. As may be seen from its connection, this sinus may become secondarily involved from extension of a similar disease of the lateral or cavernous sinus. It may also become involved from an infection in the mastoid cells by traveling along the mastoideo-petrosal canal.

On account of the very free communication between the lateral sinus and the mastoid antrum and cells by way of the mastoid veins, infection may easily follow this route.

The internal jugular vein may be the site of a phlebitis or thrombosis secondarily to such a condition existing in the lateral sinus. Primarly it may be affected by way of the small foramina in the floor of the middle ear which transmits the auricular branch of the vagus nerve, or the floor of the tympanum may become necrosed and open directly into the jugular bulb containing the jugular vein; or, again, there may be a natural deficiency in the bony floor the tympanum, and the exposed vein would very likely be open to an infection.

It might be appropriate here to mention that a necrosis may extend in such a direction that the case may terminate fatally from hemorrhage by a carious perforation of the carotid canal and ulceration into the carotid artery.

SYMPTOMS.—The symptoms of phlebitis and thrombosis of the cerebral vessels vary greatly with the particular sinus or sinuses involved. In common, we have symptoms of pyemia; that is to say, a sudden or high temperature, accompanied by rigors and perspiration, and ultimately metastatic abscesses.

That all these symptoms necesarily exist in every case does not by any means follow. At times they are so insidious in their manifestation that they may escape detection. Some observers think infective sinus thrombosis is more likely to occur where the streptococci are present in the purulent ear secretions than when the staphylococcus alone is there. In the differentiation between the location of the particular sinus, Schwartze says thrombosis and phlebitis of the lateral sinus due to otitis media is diagnosed only when pyemic symptoms are present. Gerhardt mentions a condition of lesser distention of the jugular vein on the side of the obstructed lateral sinus, but Schwartze has found the opposite condition.

Griesinger and many others believe a painful edema over the mastoid as a symptom of lateral sinus thrombosis, due to the extension of the clot through the emissary vein, is diagnostic; but this must not be confounded with a swelling of the mastoid region accompanying disease of the mastoid cells.

If the thrombus in the lateral sinus extends downward to the internal jugular, we have swelling, edema and pain in the neck and face, and often a distinct erysipelatous inflammation of the skin of the cheek and forehead. That a thrombosed condition of this vein may exist without producing the usual symptoms of a hard, cord-like feeling in the neck, pain and edema is a fact, and is seen in a case reported by Eulenstein, where the internal jugular was excised for a thrombus extending almost to the innominate.

In case the cavernous sinus is involved, we have some distinct symptoms; and to favor a more comprehensive understanding of them, we will but briefly make mention of a few anatomical facts. The vessels tributary to this sinus are the (1) superior and inferior ophthalmic veins; (2) sphenoparietal sinus, arising from a meningeal vein; (3) central retinal vein; (4) inferior anterior cerebral vein.

In the case of the superior and inferior ophthalmic veins, these two vessels do not empty their main flow of blood into the cavernous sinus, but into the facial veins; therefore, thrombosis of the cavernous sinus does not necessarily very materially affect the orbital veins.

The central retinal vein communicates with the superior ophthalmic vein; but, according to Henle, it often empties directly into the cavernous sinus. This is of importance, and explains the Gräfes theory of "congestive papilla." But this theory is not always tenable, for in cases of obstruction in the cavernous sinus where the retinal vein empties into the superior ophthalmic vein, the blood may find an outlet through the facial vein, with which it communicates, and hence, in such case, no marked congestion of the papilla would exist.

The cavernous sinus empties into the lateral sinus by way of the superior petrosal sinus, and into the internal jugular vein by way of the inferior petrosal, and into the anterior vertebral plexus by way of the basilar plexus. (Virchow.)

Aside from these main routes, it has other outlets in the form of minute veins communicating with the outside of the skull.

Lying within and passing through the cavernous sinus, we have the following structures: the internal carotid artery with its sympathetic plexus, the third, fourth, sixth and ophthalmic nerves. Pressure on the third nerve would cause a paralysis of the upper eyelid and a divergent squint; also rotation on its vertical axis would be prevented. In the very beginning the pressure symptom would cause a contracted pupil from irritation of the papillary fibers of the oculo-motor nerves. Later dilatation of the pupil would result, due to the paralysis from continual pressure. Irritation of the sixth nerve, which supplies the external rectus muscle of the eyeball, would cause the eye to rotate outward, while a paresis of the same nerve would cause the same to rotate inward. This nerve, as a rule, is affected earlier than the third nerve.

Irritation of the ophthalmic nerve gives rise to a supraorbital and frontal neuralgia. Where the pain is local and confined to the course of the supraorbital and frontal nerves; the source of irritation is, in all likelihood, located in the cavernous sinus. But in case the pain is diffused over the entire half of the head, the pressure most likely comes from a meningitis, which involves the second as well as the third branch of the trigeminal nerve. The pain is accompanied by a hyperesthesia of the skin of the same region, which, at the same time, is warmer and redder. There are present other symptoms of irritation, like lachrymation and photophobia. Later on, when the pressure causes paresis of this nerve, we have a condition of anesthesia of the skin of the forehead, eyelids, ocular conjunctiva, and anterior portion of the nose. The skin at the same time becomes pale in color and cool to the touch.

As a result of interference with circulation from the clot formation in the cavernous sinus, we have a damming back of the blood in the veins tributary to the sinus, causing an edema of the eyelids, conjunctiva, forehead and nasal mucous membrane. This condition exists first only on one side, but soon spreads to the opposite, owing to an extension of the clot to its neighboring sinus by way of the transverse and circular sinuses. This is well illustrated in the following case of mine:

H. K., two years, first seen by me January 23, 1900, with an acute left-sided mastoiditis. Temperature 104 degrees. Had been complaining of ear since two weeks. There was no discharge. Advised an immediate operation, but parents refused consent. Ten days later, February 2d, I was hurriedly called for and found the little patient in a partially comatose condition. Rectal temperature 106 degrees. Had a dry, hot skin. Father said in the interval of my seeing the child scarlet fever had developed, for which it had been treated by the family physician. The scarlatinal rash and, at places, desquamation were still present. Some signs of meningitis were evident, as shown by the contracted pupil and the burrowing of the head in the pillow when disturbed. Great intumescency of the tissues above, anterior and posterior to the ear, with induration in the neck. No ophthalmic examination was made. Father now implored me to operate. It was a hopeless undertaking, but I consented. At 4 p. m. of the same day I performed a tympano-mastoid operation. The tissues all about the ear were greatly infiltrated with pus. Coming to the cortex, a large sinus just over and leading directly to the antrum was found. The bone was well chiseled away in all directions. I could not, by careful search, discover any avenue of necrosis leading to the interior of the skull. The bone was soft and permeated with the pus. An ice pack was ordered on the head after the operation and kept there. The next day the morning temperature was 103 degrees and by afternoon down to 101 2-5 degrees with a pulse of 128. No delirium nor convulsions. The third day the temperature went down to 101, but later up to 103 degrees, and fluctuated between these two points. There was some edema of the soft tissues about the left eye, which spread to the side of the head. This was accompanied by a restlessness, but no vomiting. A tremor of the hands became noticeable with slight attacks of convulsions. Marked induration of opposite side of neck with pain over the mastoid on this side was evident. On the fourth day the temperature remained above 102 degrees, not varying more than half a degree, but the pulse was up to 130. The edema on the left side was subsiding, but began to show about the right eye. A second operation was considered, but the condition of the patient forbade it. The fifth day temperature went down to 100 degrees, but the pulse was so rapid and weak that it could not be counted. The edema now involved both eyes so as to close the lids entirely. Enormous induration along the course of the jugulars and extending way

down the neck. The mastoid dressing was changed, wound looking good with little pus and no redness, soreness or pain on pressure. The right ear was now discharging and the mastoid very painful and swollen. I made a small exploratory incision on the right side of neck in search of a possible pus cavity, but found none. Sixth day, temperature varied from 104 to 101.4 degrees. Pulse 200. Patient restless, as if in pain. The edema about left eye now cleared up. He rapidly fell into a state of coma, and *exitus lethalis* occurred the afternoon of the sixth day. No post-mortem was allowed.

An almost identical case is one reported by J. W. Sterling. His patient was seventeen months old, having an acute otitis media occurring during an attack of scarlet fever. A mastoid inflammation complicated matters and was operated on and relieved. Three days following an edema of the left upper eyelid developed, increasing until it became impossible to examine the eyeball. One day later the right eyelid began to swell and continued as in the left lid. Two days following this the swelling of the left eyelid began to subside, the right following, and on the fourth day the eyeball could again be seen. Three days after this death occurred. Post-mortem examination revealed a thrombus of left superior petrosal, cavernous and circular sinuses.

Tinnitus and deafness may be symptoms of inferior petrosal sinus disease, on account of the labyrinth vein emptying into the sinus, which, being obstructed, causes a congestion of the inner ear. Where the superior longitudinal sinus is involved in the process, there may be epistaxis, which is profuse and recurring, associated with epileptic symptoms, convulsions and, at times, unconsciousness.

Pus Collections.—These may exist as—

First.—Extradural abscess;

Second.—Subdural abscess;

Third.—Cerebral abscess;

Fourth.—Cerebellar abscess.

The condition known and spoken of as localized purulent meningitis is the same as extradural abscess. Here the infective process within the ear, in its progress toward the brain,

develops a mild type of meningitis about the point where the infection is to enter. The dura becomes cemented to the bone, and as the infection enters the cranium it is nicely walled off and confined to the site of the meningitis.

Where the invading process is more rapid and there is not time for the dura to throw out sufficient inflammatory material to act as a barrier to the further progress of the condition, we have an entrance effected through the dura into the subdural space. Here, possibly, the brain membranes have marshaled sufficient force together to stay the progress of the advancing disease, by throwing up a similar intrenchment to confine the disease, as that attempted by the dura on the outside.

In case this is not successful, we have the infection entering the brain substance itself to form a cerebral or cerebellar abscess.

From this it is to be seen that pus may collect either external to the brain membranes, forming an extradural abscess; between the membranes, forming a subdural abscess; or inside of them, forming cerebral or cerebellar abscess. Any single one or a collection of these conditions may exist. It is estimated that 20 per cent. of the otogenous cerebral abscesses are multiple. Knapp places the number at 4 per cent.

As to the location of the abscess there is a great variation. In case of necrosis, its location may bear no relationship to the point of entrance of the disease. For instance, in necrosis through the roof of the middle ear into the middle brain fossa, there may result the formation of an abscess outside of or between the membranes of the brain. From this abscess fistulæ may lead to a point distant from its entrance from the ear into the brain tissue. In exceptional cases, the brain lesion has been found upon the opposite side from the affected ear. Again, the abscess within the brain need show no communicating sinus between it and the neighboring dura mater and bone.

The majority of brain abscesses are of the medullary variety. It is the exception to find them in the gray matter.

Just to show the frequency of ear disease as a cause of brain abscess, I give you the statement of Von Bergman and Barker,

who claim that one-half of all such abscesses are due to otorrhœa. Meyer and Ogles' estimate of the same is placed at 30 per cent. Traumatism has generally been conceded to be the commonest cause of brain abscess; neglecting, to my thinking, in recognizing that the abscess condition is in some of these cases secondary to an ear trouble, lighted anew by the injury, and thus crediting the injury as the prime cause of the abscess.

In discussing the location of these abscesses, it interests us in particular to differentiate between the cerebral and cerebellar varieties. Were we to know the exact avenue by which the infection entered, matters would be simplified in many of our cases. And this is not always impossible. Absence of mastoid symptoms may not necessarily lead us to exclude the possibility of cerebellar disease.

In discussing the subject of various points of entrance of the disease, I mentioned the internal auditory canal and meatus as an avenue leading to cerebellar abscess, its opening being below the tentorium and within the posterior fossa. Two cases reported by Thomas Barr very beautifully illustrate this by showing on the specimen how the infection traveled from the middle ear, by way of the labyrinthine spaces and auditory and facial nerves to the posterior fossa, and caused a cerebellar abscess.

In general, authorities agree that young children seldom suffer from otitic abscess, Koerner giving the cause as due to the greater distance of the posterior fossa from the ear. They occur most frequently between the ages of ten and thirty. Out of the one hundred and seventy-seven cases of abscess of otitic origin, Koerner found ninety-eight were in the cerebellum and seventy-nine in the cerebrum; while of fifty-seven cases of intracranial complications found in Pitt's nine thousand autopsies, three were abscess of the cerebellum and fourteen of the cerebrum.

Of the cerebral abscesses of otitic origin, the temporosphenoidal lobe is the most general location; while those in the cerebellum, in the main, are situated in one of the hemispheres and along the course of the sigmoid sinus.

Symptoms.—To my mind, the history of having had or still having purulent middle-ear disease is symptomatic of, although in itself not sufficient to diagnose, abscess of the brain.

Any brain symptoms that may be present in an acute suppurating middle-ear disease are usually so obscured by the more intense otitic ones that the congestion or mild inflammatory condition of the brain membranes may be overlooked, as all the attention of the patient is directed to the painful ear.

Hence, in the early or so-called "forming stage" of the abscess, most of the symptoms escape us or are interpreted as due to other conditions; and as a result it is not until the fully formed abscess is present that we realize the importance of our case—and in some instances not then, for such abscesses have been known to exist for years without causing any apprehension of their presence; so that during the forming or initial stage of the abscess the symptoms are either mistaken for some other condition, or are overshadowed by the more acute ear pains. During the quiescent stage, which varies from days to months and in some few cases to years, there are, of course, no symptoms; and it is in the great majority of cases during the fulminating stage that the symptoms that I will now discuss are to be found. These remarks, of course, have reference to the chronic abscess. In the acute abscess we do not have a distinct capsule formed, as in the chronic variety, and as a general rule there is no period of quiescence.

Of the several symptoms to be mentioned, that of headache is the most common; not necessarily on account of its severity, for this varies a great deal, but more on account of its frequency. It occurred in two-thirds of all of Meyer's cases. According to Ladame, it occurs more commonly in abscess than in tumors.

As a rule, it is the earliest symptom we have, and is usually located over the site of the lesion, although this is not invariable, as it may be diffuse, over the forehead or over the entire head.

The pain is not so acute in the initial stage; there remains only a general dullness of the same. This, too, is true of the

hypersensitiveness about the head, and particularly over the site of the lesion. Pressure and percussion on the skull will make the patient wince, but the pain is not transmitted to the opposite side. This we noted as more common in sinus disease.

The state of mental hebetude is a somewhat prominent symptom. The mind seems not to work well for itself. Even when prodded on, as in conversation, there are marked evidences of a halted cerebration. The patient when spoken to seems to have his mind on something else. He responds to one's questions slowly and methodically, as if weighing every word, and when there is a lull in the conversation he may fall asleep. Macewen compares these symptoms somewhat to those of poisoning by opium.

Next to headache, Meyer found fever to be a prominent early symptom. It occurred in one-eighth of all his cases. But, as just stated, the diagnosis of abscess, as a rule, is not made early in the disease, and hence found to be subnormal. The differences in temperature findings are very likely explained in the accompanying condition found early in the disease, the temperature being due to the accompanying phlebitis or meningeal congestion, or to the acute suppurative process. Such is seen in a case of Ridley's, where a cerebellar abscess was found in a boy of fourteen years with chronic otitis, presenting marked pyemic symptoms, temperature 99 to 105 degrees, but with a slow pulse, respiration and cerebration. In uncomplicated cerebral abscesses the temperature is usually about normal or slightly subnormal, 97 to 99 degrees.

Pulse and respiration are slow. The former is what is known as cerebral pulse—that is, slow and full, and varying between forty and fifty beats. The slowness of the pulse is due to the pressure exerted by the abscess, but is not always necessarily lowered in proportion, as the abscess is large; for a large abscess may be accompanied by a sufficiently large amount of brain disintegration so as to lessen the amount of pressure exerted by the accumulated pus.

The respirations are also slow and regular, but at times may

be of the Cheyne-Stokes type; and especially is this likely to be true where the abscess is located in the cerebellum. A peculiarity in both the temperature and pulse is to be noted where the abscess is emptied. At first they immediately rise, and then synchronously fall to the normal. As with temperature, so with rigors. The earlier the case is seen, the more prominent is this symptom. Later on it is exceedingly uncertain in appearance and variable in degree.

Vomiting is another early symptom, and is very frequently present, but becomes less so as the fully formed stage is reached. It is characteristic in that it is spontaneous, unaccompanied by nausea or retching. Obstinate constipation, especially in the otherwise regular, is, in connection with the other symptoms, diagnostic.

Dizziness and vertigo, on attempts to get up or move about much, are oftentimes present.

The presence of convulsions and paralysis depends a great deal on the particular part of the brain involved; and hence, if present, may be symptomatic of the location of the abscess. Paralysis of the third cranial nerve would cause ptosis, strabismus and dilated pupil.

Examination of the eyes for the finding of changes in the fundus will, in many cases, prove positive; but it is not as constant a symptom in abscess as it is in tumor. To show the value of ophthalmoscopic examination in these cases, I refer you to the work done by Gradenigo, Delstanche and others, who show that in one-half of all cases of intra-cranial complications due to middle-ear disease we find lesions of the papilla.

Owing to the abscess being, as a rule, situated outside of the motor area, symptoms of localization are seldom present, although at times such may appear. In some cases of abscess of the temporo-sphenoidal lobe, we may have a hemiplegia of the opposite side, involving the face, arm and leg. It may be partial or complete, and occur in the reverse order.

Aphasia is another one of the less seldom symptoms. If it is of the sensory type—word deafness—the abscess would be located in the posterior part of the temporo-sphenoidal lobe;

and if of the motor type, its location would be at the base of the third and ascending frontal convolution.

In case the abscess is located in the cerebellum, the head pains in the last stage are persistent and very often intense, and, as a rule, located at the occiput and nape of neck.

Vomiting is also more constant and uncontrollable than in temporal abscess. Koch mentions as diagnostic the possibility of double-sided amaurosis as contrasted to temporal abscess, where this has never as yet been noted. Koch also mentions the presence of patellar reflex disturbance, more often decreased, as a symptom wanting in temporal abscess, and at times present in cerebellar abscess.

Emaciation and loss of muscular strength are very noticeable symptoms, the cause of which may be found in the explanation of Luciani, who says that within the cerebellum reside the centers for the musculo-nervous apparatus.

Abscess of the occipital and frontal lobes as the result of ear disease is the exception, and occurs only seldom, and then as the result of an infective embolism (Macewen).

Differential Diagnosis.—This phase of the subject is of the utmost importance to the operator. He has a variety of conditions to deal with, some of which require quite a different procedure in operating than others. The symptoms of sinus thrombosis and abscess stand out in bold relief from one another, and as individual conditions are not to be confounded; but where we have a combination of conditions, as very often occurs in sinus thrombosis and cerebellar abscess, we may find ourselves with a very difficult problem to solve; but in just such a combination of conditions as is mentioned it matters not so much, as the route of operative procedure may be the same—that is, through the mastoid *via* the sinus and on to the posterior fossa. But when we come to differentiate between an abscess in the cerebrum and the cerebellum, it becomes a matter of much greater difficulty. The latter produces less marked local symptoms, and hence is more difficult to diagnose than the former.

Luc declares the differential diagnosis between subdural ab-

scess, meningitis and cerebral abscess to be difficult, and advises an exploratory operation, consisting of a series of incisions—first through the dura—and if no pus is found then through the pia, and then, if necessary, through the cerebral tissue. He condemns puncturing the membranes in an effort to locate a pus cavity in the brain, but instead advises going step-wise. This same advice seems applicable in cases where doubt arises between a phlebitis and thrombosis and a pus collection in the cerebellum. Although incising the membranes has its advantages, they seem to be offset by the liability to hernia of the brain and its results. Puncturing of the dura before exploring the brain tissue may be done aseptically with a heated electrode.

At times we are called upon to differentiate between diffuse purulent meningitis and that of abscess and sinus disease. Often this very condition masks the forming stage of an abscess within the brain tissue. As a means of differentiating between such a condition of meningitis or that of brain abscess from sinus disease, examinaton of the cerebro-spinal fluid is at times employed. Leutert and Quincke recommend the lumbar puncture, while Koch suggests puncture through the dura at site of operation as methods of procuring the fluid. Absence of polynuclear leucocytes, increase of fluid matter, clear fluid, absence of micro-organisms, are negative signs. This method would seem of greater value in determining between a meningitis serosa and an abscess of the brain on account of the excess of fluid present, and by withdrawing some would materially relieve the symptoms and possibly cure the trouble. But as this condition so often accompanies that of abscess, little may be gained curative by such method.

Other varieties of meningeal trouble, like tuberculosis and a simple hyperemia, have often to be excluded. Both are usually confined to children. The tubercular meningitis is, as a rule, secondary to a tubercular affection in the ear or some other organ.

Tumors are at times to be considered in the diagnosis, but their very slow growth and the absence of ear disease are usually sufficient to exclude them. There is a growth that com-

plicates ear disease, which was described by Balfour, and called chloroma. It is a very rare and malignant disease, and occurs in the young.

In case facial paralysis is present, it may be important to differentiate between that of cortical and of peripheral origin. Macewen says that in the cortical kind the paralysis is not as complete, and the sense of taste in the anterior two-thirds of the tongue remains intact.

As a means of diagnosis, percussion of the mastoid is being relied upon more and more nowadays. Authorities like Macewen and Koerner advocate and indorse it.

Just to show how a continued and overlooked cause of pyemic symptoms may occur, let me but briefly refer to a case of infected thrombosis of the sigmoid sinus belonging to C. Barck. Ligation of the jugular vein had been performed in order to limit the systemic infection, but on autopsy a large abscess containing two tablespoonfuls of pus was found situated in the posterior cervical triangle under the deep fascia of the neck, communicating directly with the sigmoid sinus by way of the mastoid foramen.

Prognosis in Otitic Brain Abscess.—The course of the chronic abscess, when not interfered with, is death: due either to rupture into the ventricles of the brain or upon its surface, or from extensive edema, or, as in some cases, anemia of the brain. Kopke, in reviewing one hundred and forty-one cases operated on, found 40.4 per cent. were permanently cured. Twenty-six were acute, showing 42.3 per cent. cured, and the rest were chronic with 43.1 per cent. cured. He found cases with normal or subnormal temperature offering a better prognosis. In the acute variety death is the usual termination when not interfered with surgically. It occurs anywhere between eight days and four to six weeks. A very rare exception to this is a case seen by me in consultation with Dr. Porter, of Chicago. The very uniqueness of this case warrants its recital here.

R. W., two and one-half years, on the 26th of January, 1900, was suddenly taken ill with a convulsion. Temperature, 104 degrees. Vomited once. A diagnosis of entero-colitis was

made, and he was put on small doses of calomel. The following day the temperature was 99 degrees. No more convulsions or vomiting. From January 29th to February 5th the temperature ranged between 104½ and 99 degrees with rather sudden remissions. Patient very restless. Meningitis was suspected and a specialist on children's diseases was called in, who diagnosed tubercular meningitis. Its cause was looked for about the ear, but no evidence of any ear trouble could be made out by them. From the 5th to the 9th the temperature was between 97 2-5 and 98 4-5 degrees, pulse 116 to 88. Patient very restless unless under full doses of bromide. Inclination to throw head backwards and arms over head frequently. From the 9th the temperature went gradually up, until the afternoon of the 12th, when it reached 103. Then it fell again to 100, only to go up once more to 103 on the following day. The pulse became very weak and stimulants had to be used continually. He was somnolent most of the time and without any bromide. On the 14th the temperature became subnormal and remained so for the next seven days. At this time the eyes were examined by an oculist, but no fundus changes were found. On the 26th I saw the patient for the first time during his illness. I had seen him a year prior to this when suffering from an acute otitis media with pain over the left mastoid, but this subsided in two or three days. The little patient was emaciated to the extreme, and as a consequence was weak and anemic. His right ear began discharging the day before, and when I saw him was continuing so. The secretions were examined and found to contain only the streptococci and staphylococci. The left ear was dry, but the drum membrane bulged slightly, showing fluid within the middle ear. The posterior superior wall of the ear canals showed no sagging whatsoever. Both mastoid regions were sensitive to pressure, but presented no redness or edema. Temperature at this time was 100 2-5 degrees, and his speech was disturbed. The aphasia was of the ataxic variety. When spoken to his answers were long drawn out, in measured style, and not entirely correct. Very often the wrong word was used. There was clearly a lack of co-ordination in the muscles concerned in speech production. Two days later the left ear began discharging, and both ears continued to discharge profusely, with a corresponding rapid improvement in the patient. One week later measles developed, endangering

the life of the already exhausted little one, but fortunately he weathered this last trouble safely, and when seen last by me, only a few days ago, he was in the very best of health.

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DISCUSSION.

DR. J. A. STUCKY, of Lexington, Ky.—Personally, I want to express my extreme gratification and appreciation of this excellent paper. I think the Society is to be congratulated on having such a scientific presentation of diseases of the middle-ear as has been embodied in this paper. I do not feel that I can add anything to what has been said, and as there was nothing mentioned about the treatment, it is a good place for me to stop.

DR. HAROLD N. MOYER, of Chicago.—What are the practical deductions to be drawn from the paper of Dr. Stein, and the presentation made by Dr. Holinger? The subject is one that concerns general practitioners as well as specialists. While I have no figures at hand to quote, in a general way about one-fifth of all the cases of scarlet fever that we treat have some middle-ear trouble in the course of the disease. Nearly 70 or 80 per cent. of those who have had scarlet fever have middle-ear trouble. Cases of peripheral facial paralysis that come on slowly are usually due to middle-ear trouble. A large proportion of the cases that develop obscure brain symptoms, particularly in childhood, have middle-ear disease. You will find a considerable number of brain cases, seemingly primary, in which there is not a single statement from the patient that there

is middle-ear trouble, have the starting point of the disease in the ear. To sum up, it means that the diagnosis which we make of inflammation, sometimes of abscess, occasionally of tumor or meningitis, have been erroneous in many respects, in more than one-half of them the infection can be traced to the ear. The pathology of these inflammations of the brain and its membranes will have to be rewritten from the standpoint of what we have heard to-night, and it will be but a repetition of what we have learned in regard to intra-abdominal conditions, namely, that the old diagnosis of peritonitis, inflammation of the bowel and typhlitis of twenty-five years ago, have resolved themselves, in 70 per cent. of the cases, into infection from the appendix. This subject, then, stripped of its scientific technicalities, is one of vast practical importance to every general practitioner. It is a thing that he must recognize if he would keep in front of the clinical procession.

DR. W. H. BATES, of New York City.—I have listened to the paper of Dr. Stein with a great deal of interest, and I recall what I read several years ago of some pathological examinations which were made by a European observer, whose name I cannot at present remember, who examined the ears of children that died of measles. He was particular in his report to state that he examined the ears of those who presented no ear symptoms in life. The most remarkable fact to me was that every case of measles had middle-ear disease, more or less marked, even though there were no manifestations of it during life. Another fact to which he called attention was, that the Eustachian tube was usually plugged with mucus. He likewise found pus in every case in the middle-ear which died of measles.

DR. EMORY LANPHEAR, of St. Louis, Mo.—It seems out of place to offer any criticism on so admirable a paper as this, and yet, basing what I may say upon my own experience, I must disagree with the statement of the author that the diagnosis of intracranial suppuration is usually easy. It has been my fortune to operate upon a large number of these cases, and I must say there has been no class of cases, in all of my experience, in which I have been more in doubt as to the conditions to be found within the skull than in abscess of middle-ear origin. Particularly has it been difficult to differentiate between a rap-

idly growing tumor and a slowly developing abscess. The author of the paper has cited the opinion of some gentlemen across the Atlantic to the effect that in the suppurative conditions we have early affection of the papilla. This I do not believe to be true, and it is fortunate indeed for us as diagnosticians that it is not true, for in papillitis or optic neuritis we have a symptom pointing almost unmistakably to tumor; whereas it is only in the smallest proportion of cases of intracranial abscess that we have papillitis present; at least that has been my observation. In only two cases of abscess of the brain I have operated upon has there been any disturbance discoverable with the ophthalmoscope. In spite of the fact that we are not always able, clinically, to say that this is a case of abscess, and that that is not a case of abscess, surgically, we have a means of determining whether or not abscess is present; viz., by exploration. Nor are we at sea as to the point of attack, for in at least 90 per cent. of the cases of abscess of the brain, dependent upon middle-ear disease, if the trephine be applied within one inch above, and three-quarters of an inch behind the outer orifice of the external meatus, we will strike the abscess, if abscess there be. In making an exploratory opening, as I have done in a number of cases, where pus was not present, as well as in some cases where pus did exist, I have followed the advice of Dr. Stein, or, at least, have followed the same rule he advocates, namely, not to use the needle for puncture purposes. In my early experience in intracranial surgery, I made use of the needle for exploratory purposes, but I found that it did not do as well, and that it left behind scars of greater significance than those produced by a knife-blade. Therefore, having opened the dura, and being ready to make further exploration within the brain, it is now my practice to take a thin-bladed bistoury and pass it in the direction in which the suspected tumor or abscess is presumed to lie, by gently turning the blade from side to side, we make an incision in the brain, which is a clean cut, and which, upon the withdrawal of the blade, easily collapses, allowing of almost perfect healing of cerebral tissue. If upon making this exploratory operation in the region I have indicated we do not find an abscess, it is recognized by every general surgeon, and I have no doubt by aural surgeons, as good practice to make an operation over the occipital lobe and resort to exploratory puncture in that part of the brain, be-

cause in nearly 10 per cent. of the cases of brain abscess, where the suppurative focus is not in the temporo-sphenoidal region, I have mentioned, it is in the occipital region and can be reached through a small trephine opening in the occipital bone.

There is one point of particular interest to me in the paper of Dr. Stein, on account of a clinical experience, and which should be of import to every one doing general surgery, namely, that abscesses may be present from middle-ear diseases when the trouble is apparently of traumatic origin. In a case which I published in the *Journal of the American Medical Association* some ten years ago, the man was shot in the head, and was not operated on at the time of the injury. Weeks subsequently he developed evidences of cerebral abscess. Presuming, as one naturally would, that the abscess was located at the site of the ball, I trephined at that point and found pus. For three or four days marked improvement was manifest in his condition; his temperature became almost normal, and I thought he was going to recover. Suddenly he became worse and died. A Coroner's investigation of the case showed that the cause of death was from middle-ear disease and abscess, containing an ounce and a half of pus, situated in the temporo-sphenoidal convolution of the side opposite the point of injury. If I had known this, I could have operated on that side, and possibly have saved his life. In view of this experience, I wish to emphasize the fact that it is possible that we may have in some of these cases double abscess, one traumatic, the other of aural origin?

DR. J. HOLINGER, of Chicago.—A few conclusions suggest themselves after looking at these pictures I have just presented.

1. The cavities of the mastoid process are bottle-shaped, and communicate with the antrum, but are more or less isolated among themselves. It is, therefore, evident that opening one of the cells does not drain the others, but through the antrum. We ought to break down all the partitions between the cells in the acute cases and follow a little oozing of pus to its origin. Any one who is afraid of injuring the facial nerve does not know the anatomy, and had better keep his hands off. If there is no pus left, the healing does not take more than from one to three weeks. When we see cases get well in which only small

openings were made, or after Wilde's incision, it means taking chances and gambling on the patient's life. Secondary operations are not infrequent.

2. While we may use a curette for breaking down partitions, this instrument ought to be avoided as soon as we approach the antrum, because injury to the mucous membrane, even if it is inflamed, means causing the wall of the antrum to granulate and the antrum to grow shut, thus closing the mouths of those cells that were not drained. If a recurrence in any of those cells should occur at any time, the way to the outside would be blockaded by the old scar, and the pus, following the direction of the least resistance, would advance either towards the soft tissues of the neck, or, worse yet, towards the brain.

3. Chronic suppurations must be treated differently from the beginning. There the bony partitions and mucous membranes are usually so low as to their nutrition, that we never know which parts will recover, and when the granulations once cover them, a sequestrum may be hard to detect. Our aim in these cases, therefore, should be to create one large cavity of the mastoid, the antrum, the middle-ear and the external meatus with a wide, large, perpetual opening to the outside, through which we can see and carefully inspect every part of the walls. Not a corner, not a niche, ought to be hidden away behind coulisses. In some cases it is possible to use the external meatus, but in others we cannot dispense with a perpetual opening behind the auricle. The objection that this hole does not look well is a ridiculous one, if we compare the looks with its usefulness.

DR. STEIN (closing the discussion).—I desire to thank the gentlemen for their remarks in regard to my paper. With reference to the remarks of Dr. Lanphear, he said that he did not agree with me that it was easy to differentiate between cerebral abscess and sinus disease, and I agree with him in that regard. What I said in my paper was not put in that way. I tried to convey the idea that simple, typical cases of abscess or sinus disease were so diametrically opposed to each other, that we do not find them usually that way; that, therefore, it is difficult to differentiate between the two, as the symptoms clinically are vastly different. The importance of ear symptoms is another thing that Dr. Lanphear called attention to in connection with the last case cited by him, and he brought out very nicely the differential diagnosis between tumor and abscess. In the

average case we do not have much trouble in differentiating between a tumor of the brain and an abscess of that organ. Mind you, there are no ear symptoms in connection with tumor of the brain unless they are simply coincidental. We have a great many symptoms of abscess of the brain that we do not get in tumor of that organ. Of course, I speak of acute symptoms, elevation of temperature, etc. Dr. Lanphear spoke of eye symptoms. Admirable work has been done in this line by two investigators, who deserve a great deal of credit for what they have accomplished. They have reported many cases, and they found in less than 50 per cent. of them there were changes in the fundus similar to those which we find in brain tumor, only in the latter condition these changes are found more frequently.

The remarks of Dr. Bates as to the frequency of middle-ear complications during the various diseases of childhood, particularly measles and scarlet fever, as well as the remarks of Dr. Moyer, are very trite, and I am glad to note that Dr. Bates believes that these complications exist in almost every case.

XV.—SYPHILIS WITHOUT CHANCRE.

BY W. FRANK GLENN, M. D.

NASHVILLE, TENN.

There is perhaps no disease which we are called upon to treat, in which the laws governing its cause and progress are more absolute and more to be relied upon, than syphilis; at the same time there is no other disease in which at times there are such marked exceptions to its fixed laws. Year after year we have had our views of different iron-bound, unchangeable laws governing syphilis, necessarily to yield to known exceptions.

First, it was taught that unless the primary sore was a hard (indurated) one it was not syphilis. In that our error was soon discovered, though only after a bitter fight on the unity and duality of the two germs. Again it was taught and believed that the period of incubation was always twenty-one days, no more, no less. Now we well know that while it is generally about twenty-one days, it may and does vary from twelve days to three months. Again, we were taught that the lym-

phatics of the inguinal region must necessarily be indurated or it was not syphilis; now we well know there are exceptions to this law. Again, that chancre was sure to be followed by some secondary symptoms, whether treated or not, but I know of at least one exception to this rule in my own practice. And, lastly, we were taught that Colle's law was infallible, and to which there was never an exception. There was no law governing syphilis which was regarded as more inviolable than that the mother of a syphilitic child could not contract syphilis, yet there are now reported twenty-seven well authenticated cases of exceptions to this rule.

After a careful study of this marvelous disease, I have reached the point where I am prepared to say that there is no law governing syphilis in any of its stages, which is not subject to exceptions. I am prepared to believe that syphilis can be contracted and become manifest in its secondary stage without any chancre having existed at all. And, while I believe there are fewer exceptions to this law than any governing syphilis, yet that there are exceptions, I do not doubt, and am sure I have seen and treated two such cases.

Three years ago a gentleman consulted me about an eruption which to all appearances was a typical papular syphilide. Upon the most careful cross-examination, I could elicit no history of the previous existence of chancre on any part of the body. After trying every other form of treatment without avail, I resorted to mercury, which rapidly caused all symptoms to disappear. He was, consequently, continued on mercury for two years, and made an uneventful recovery. This gentleman was a man whose integrity and veracity were not to be doubted, and who, furthermore, had no object in deceiving himself or me.

In August, 1899, a lady of high repute, married for eight years, consulted me about an ulceration of the right tonsil and uvula. At first I did not suspect anything but ordinary ulceration. But after two weeks of thorough antiseptic treatment, its rapid advance and distinct appearance of tertiary ulceration caused me to be suspicious, and I made a most thorough investigation of the history of the patient and a close physical examination of the patient and her husband, but no trace of

syphilis could be found. I will state here that I have been the physician of the husband for the past eighteen years, and know he has not had syphilis in that time. I was loath to believe that it was possible for this lesion to be syphilis, but the rapid advance of the ulceration, now encroaching upon the larynx and threatening serious injury to the vocal cords, together with utter failure of everything I had used, I put her upon full doses of iodide of potassium, combined with a twentieth of a grain of biniodide of mercury, and was gratified to find the throat completely cured in two weeks afterward.

Now, from these two cases and from a few others, which I believe were of a similar nature (but there being *some* room for doubt, they are excluded), I draw the following conclusion:

1. There is no law governing syphilis in any of its stages to which we may not expect to sometimes find exceptions.

2. That while it is extremely rare, nevertheless it is possible to have the secondary or tertiary manifestations without the previous existence of a chancre.

XVI.—THE GONOCOCCI IN THE GONORRHEAL SECRETION.

BY A. RAVOGLI, M. D.

CINCINNATI, OHIO.

The microscopical examination of the abnormal secretions of all the mucous membranes which are liable to be infected by gonorrhea is of the greatest importance for the diagnosis, treatment and phophylaxis if this disease. It is a great responsibility for the physician to establish the diagnosis of gonorrhea which cannot otherwise be confirmed than by microscopical examination. Medico-legal questions arise very often on this delicate subject, and on the microscopical examination hangs the honor of a woman and the peace of a family. It is not a trifling thing to say to a patient, without finding the gonococcus, you are affected with gonorrhea. We often see cases of

profuse muco-purulent discharge from the vagina, which, examined under the microscope, does not reveal the presence of the gonococci, and is, therefore, of entirely different origin.

The gonococci are so characteristic in their appearance, and in the way they are grouped, that there is no difficulty in establishing the nature of the abnormal secretion from their presence. When a purulent secretion is blennorrhagic in character the number of the gonococci in groups is always considerable, and they are easily distinguished from other diplococci which may be present. Lustgarten and Mannaberg wrongly attached the diagnostic significance of the gonococci, on account of the discovery of a few diplococci also closed in cells in the normal urethral mucous membrane. Finger[1] rightly maintains that the presence of a few diplococci does not affect the diagnosis of gonorrhea. They have an entirely different appearance, different way of grouping and different ways of reaction to the stains, and when the gonococci appear in the specimen there can be no doubt about the gonorrheal nature of the disease.

The examination for the gonococci is so easily made that any one without deep microscopical knowledge is able to prepare the specimen in a few minutes. The gonococci very quickly absorb the aniline color, and a cover glass smeared with the secretion, after being dried and treated with a solution of methyl blue, will readily show the gonococci in the form of small black dots grouped together. This is Gram's method, and it is based on the property of the gonococci being decolorized, while alcohol does not affect the staining of other cocci. To demonstrate this it is necessary to take a cover glass preparation stained with gentian violet aniline-water; this is placed in a solution of iodide of potassium for one minute, washed and then decolorized in alcohol. After this the preparation is restained with a watery solution of fuchsin, thus the gonococci appear red, while the other cocci and bacteria appear of a deep black blue color.

The cocci are found in different relations, and we can say that the relation of the gonococci to the histological elements is

[1] Blennorrhea of the Sexual Organs. New York, 1896.

different in the various periods of gonorrhea. In the first starting of gonorrheal urethritis, the gonococci are found nearly exclusively on the epithelial cells, and in full groups. In several cases I had occasion to see patients in the very beginning of the gonorrhea, two to four days after the intercourse, only a few hours after having noticed some itching sensation in the fossa navicularis. The meatus appeared somewhat red and a little moist; no swelling or pain was yet present. By gently pressing a cover glass to the meatus I succeeded in obtaining some moisture sufficient to smear a slide. The staining with methyl blue revealed gonococci free in small groups between the different elements. They were not very abundant, and disposed in rows of two or four between the nuclei of the epithelial cells. The lymphoid cells which at this time are already present do not contain any gonococci.

In the more advanced stage when the inflammatory process reaches its height, when the discharge is abundant and purulent in character, the gonococci are exceedingly numerous and they are inclosed in the pus and the lymphoid cells, but I have never found them at this period of the disease in free heaps or in the epithelial cells. Towards the end, when the discharge becomes scanty and has a muco-serous appearance, the gonococci are found imbedded partly in the pus cells and partly disposed in free groups in the epithelial cells. These observations agree with those which have been made by Legra, Finger, Bumm, Guiard, Taylor, See, Berdol, etc.

Orcel believes that the location of the gonococci depends on the way in which the secretion is obtained. He claims that if the secretion is taken after urinating or after washing the urethra the gonococci are found either separately or in heaps but outside of the formed elements, while when the secretion is taken before urinating or before washing the urethra, the gonococci are found inside of the lymphoid cells. Finger also refers to the same experiments made in his clinic by Crippa and Peizoli, who found the gonococci in groups outside of the cells, in the secretion which had been taken from the urethral glands, Littre glands, and Morgagni's pockets, by inserting a bougie immediately after the patient had urinated.

Padres and Droberg maintain that they have found in a series of cases of acute gonorrhea and especially in those cases which after a while had a severe course and bad consequences, that the gonococci were mostly free, outside of the cells, while in the ordinary cases with a tendency to a benignant course, the gonococci were located inside of the cells. This statement, however, is not exactly according to the observations of the authors, and Lanz[1] strongly contradicts it, as he thinks that the way in which the secretion is obtained has a great deal to do with the location of the gonococci.

He repeated the experiments of Orcel, Guiard, v. Crippa and Peirzoli, only modifying the way of obtaining the secretion. They used to secure the secretion by introducing a sharp spoon or a bougie into the urethra, while Lanz obtained the secretion by means of compression in the following way. After the patient has urinated a drop is obtained either spontaneously or by pressing the urethra gently. This drop also appears clear and contains interesting elements. The comparison of the specimen of the purulent secretion taken before urinating, and of the drop after urinating reveals that in the first the gonococci are all inside of the cells, in the second they are in groups outside of the cellular elements. In the specimens where the secretion had been obtained by squeezing, he found a larger quantity of epithelial cells covered with rows of gonococci. From these results he comes to the conclusion that the cause of the different location of the gonococci is the consequence of the pressure brought upon the urethra in order to obtain the secretion.

In my experience I cannot agree with the opinion of Lanz that the location of the gonococci depends on squeezing the urethra. I examine the secretion of every case of gonorrhea, male and female, in my practice, and the examination is repeated several times during the treatment. I take the secretion without squeezing but by simply approaching the slide to the meatus, and in the woman, by means of a small tampon

[1] Alfred Lanz. Uber die Lagerung der Gonococci in Tripper Secret. Archiv fur Derm. & Syphilis.

smearing the glass. I have constantly found the gonococci free outside of the lymphoid cells in the beginning of the gonorrheal urethritis. When the inflammatory process begins to show with severe intensity, then the gonococci are contained in the cells. The cells appear greatly enlarged and distended, full of gonococci. In these conditions I have never seen free gonococci. When the inflammatory process begins to subside, then heaps of gonococci are found free from the cells and gradually when the affection is better, the gonococci diminish in quantity and are found free outside of the cellular elements. When gonorrheal inflammation has reached a chronic stage, then the few gonococci which can be found are mostly located in the epithelial cells.

It seems to me that the location of the gonococci is the direct result of the inflammatory process due only to the fight of the white corpuscles of the blood against the cocci. The inflammatory process is not produced immediately, it takes some time to see the result of the natural reaction of the tissues. In the very beginning of the gonorrhea the hyperemia is the first step of the inflammation, the exudation has not yet begun, and for this reason the gonococci are found free outside of the histological elements. But when the gonococci are produced in a large quantity, the *vis medicatrix naturae* opposes its strength, the inflammatory process reaches its height, a copious exudation is the consequence and the leucocytes with their phagocytic properties take the cocci within their protoplasms so as to rid the infected surface.

When, however, the gonococcus has lost its vigor of proliferating, and when the tissues have got used to its toxins, they have lost their susceptibility to the reaction, then the gonococci remain hidden in the epithelial cells, in the connective tissues of the subepithelial layer, the gonorrhea is chronic. In this case we cannot expect to find the gonococci in the lymphoid cells, the fight is at an end, and for this reason we find the gonococci scattered free in heaps or bunches outside of the cells. The gonococci have lost their vigor and the tissues have lost their property of reacting, in this way the gonococci remain

hidden, nearly unobserved. But when the same gonococci come into contact with a healthy mucous membrane, on the new ground they take a new vigor, and they will reproduce a new case of gonorrhea.

It is for this reason that I have recommended at the beginning of this article the necessity of examining the abnormal secretion of any membrane liable to be affected with gonorrhea, and I have insisted on this necessity on account of the medico-legal aspect of the gonococcus, as a guarantee for the patient as well as for the physician. We do not know in those cases what the consequences may be, and if we should be called in court it is always better to have the proof in our hands.[3] From the symptoms we can say that the disease is like gonorrhea, but we cannot maintain before the court that it is such when we have not found the cocci, which in this case is the *corpus delicti.* In men and more often in women serous and mucopurulent secretions occur, from the urethra or from the vagina, due to an irritative cause, and they can easily be mistaken for gonorrheal trouble. The microscope only will put us in a position to decide with certainty on the nature of the affection. Neisser[4] in his *Forensische Gonorrhoe Fragen,* refers to the case of a gentleman who after the return of his wife from a trip, was affected with urethritis with all the ordinary characteristics of a gonorrheal urethritis. The secretion, however, in the man as well as in the wife, never showed the presence of the gonococcus. This removed all suspicion of infection, and some previous sufferings of the man with an old stricture afforded satisfactory explanation.

The question may arise as to how far we can believe the microscopical results. There is no doubt that a man may have been affected with gonorrhea a few months previously and yet at the time of the examination no gonococcus can be found in the secretion. But when we find gonococci and can show them, the gonorrheal infection cannot be denied. There are cases of gonorrhea in the woman which last for a long time with entire

[3] Cincinnati Lancet-Clinic, October, 1896.
[4] Aerztliche Sachuerstandigen Zietungen, No. 12, Berlin, June 15, 1895.

absence of subjective symptoms. In the examination of prostitutes it not rarely occurs that one finds some feeling well, protesting to be well, who under examination show endocervicitis, abrasions of the ostium, a slight discharge, which under the microscope reveals the presence of the gonococcus. They are infected, nobody knows how long; they have no pain, they believe themselves to be well, and nobody knows how many have been infected by them.

During the treatment of gonorrhea in males and females, the microscopical examination of the secretion often repeated is of great value in directing the line of treatment. Usually the number of cocci diminishes with the duration of the gonorrhea, and at the time of the inflammatory stage other bacteria are rarely found with gonococci in the male. According to the observations of Neisser, Finger and Oberländer, it must be admitted that gonococci may disappear and reappear in the discharge in a remarkable manner. After an irritating injection gonococci may suddenly reappear, although for some time they had not been found. For this reason trial injections of silver nitrate or corrosive sublimate are used, which by irritating the urethra produce suppuration, and an examination of that secretion will reveal the gonococci again, if the gonorrhea is not entirely cured. In this case we must continue with the treatment until the gonococci have thoroughly disappeared for a period of several weeks.

In gonorrheal urethritis in the male when the discharge comes from some portion of the pars pendula, it will appear at meatus in the form of yellowish, milky or transparent drops, "good morning drop" or if scanty it will glue together the lips of the meatus. When the secretion comes from the urethra above the bulb it remains in the place and will be washed out by the urine in the act of urination. In the cases of posterior urethritis, when the discharge is produced in the prostatic region, it either remains in this site or passes backward into the bladder. This secretion is found in the urine in the shape of shreds, which are of great diagnostic and prognostic value. The shreds are composed of mucus, pus and epithelium, multi-

nuclear pus cells, various forms of epithelial cells, agglutinated by finely granular mucin, which are the constituent elements of these clap threads. Macroscopically they have different appearances, some are transparent, delicate, narrow, and have a tendency to float in the urine; they are produced by superficial lesions of the mucous membrane. Other shreds are short, firm, and opaque, containing more pus cells, are heavier, and sink rapidly to the bottom; they indicate a more serious and deep alteration. In addition we sometimes find short, comma-like, punctate, firm flocculi, which come from the excretory ducts of the various glands and follicles. In consequence they are signs of chronic prostatic urethritis.

The important question for us is the presence of the gonococci. They are so constantly found in acute gonorrhea, that as Finger[5] says their absence from acute purulent secretion of the urethra excludes blennorrhea unconditionally. In chronic gonorrhea, however, it is not so easy to find gonococci, and in addition other cocci are present. From a large number of cases Goll gave systematic tables of the finding of the gonococci, showing that after the fourth week of gonorrhea the presence of the gonococci has already diminished and after two years they were only occasionally to be found in the discharge.

The clap shreds, or pus drops, may often be examined for several days without finding gonococci, and all at once they may reappear. They produce exacerbations of the process by increasing in number, and when the gonococci appear again, the pus becomes more abundant and the cells are filled again with the cocci. As already stated, the presence of the gonococci in chronic urethritis is revealed by one of these test injections. A solution of ½ per cent. silver nitrate is injected into the urethra, or, as Neisser uses it, the urethra is irrigated with a 1 to 20,000 bichloride solution. An irritation is quickly developed causing a superficial desquamation of the upper layers of the mucous membrane of the urethra, which is revealed by some muco-purulent discharge. With the first drops the accidental micro-organisms are removed, but on the following day

[5] Blennorrhea of the Sexual Organs and Its Complications. New York, 1894.

the gonococci show their presence. In some cases, however, after repeated examinations no gonococci can be found. It is an instance where the gonococci have certainly perished, but the alterations of the tissues produced by them still remain. The secretion contains no pus cells, but numerous epithelial cells, showing that it is more a kind of epithelial desquamation. Various micro-organisms other than gonococci are found in the gleety fluid in the form of short bacilli often arranged in chains in the cells and between them. They are bacteria rather than cocci. Janet studied these micro-organisms and he divided gonorrhea into three phases from the relations of the gonococci to the secondary bacteria. In the first phase he places the gonococcus alone; in the second phase gonococcus and baterial contamination, and in the third bacteria alone. These bacteria entering the urethra by means of coitus, find good ground for their development in the mucous membrane affected with catarrhal conditions from the progressed gonorrhea. In this case the gonococci have perished, but the secondary bacteria are capable of themselves to maintain an obstinate catarrhal condition, which has been called also pseudogonorrhea.

Here comes the most delicate question, the prophylaxis of gonorrhea. Is chronic gonorrhea infectious? When can we give our consent for marriage to a man who has been affected with gonorrhea?

Neisser was the first to study this question on a scientific basis. He found that the infectiousness of chronic gonorrhea is conditional for the reason that in some cases it contains gonococci, in some other cases only at times does it contain them, and finally there are cases where with the most careful and repeated examinations no gonococci can ever be found. Furthermore, as the quantity of the secretion is very small it requires time to be formed again, and for this reason also a chronic gonorrhea may not be transmitted.

But the question of assuring a man that he can get married without fear of infecting his wife is an important one and one that demands the greatest attention and study of the gonorrheal

case. Many women after marriage begin to suffer with unknown troubles. They become pale, neurasthenic, complain of back ache, and, as Julien says, recognize the origin of all their sufferings as that wedding trip. We must refer to Noeggerath, who laid due weight on the importance of the gonorrheal infection in the diseases of the uterus and its appendages. He maintained that latent gonorrhea in the man originated latent gonorrhea in the female, which after a while manifested itself by perimetritis and oophoritis. Ninety per cent of the women who marry men that have suffered with gonorrhea, are affected with uterine troubles. Although the views of Noeggerath were at first considered of a pessimistic character, yet after the discovery of the gonococcus they were accepted as facts.

The examination of the abnormal secretion oozing out of the urethra in the form of a milky drop, or of that scanty fluid which pastes the lips of the meatus, or of the shreds which are floating in the urine, will place us in a condition to answer this important question. For the examination of the shreds it requires the centrifuge to obtain the sediment of the urine. For the examination of the fluid it is necessary to inject into the urethra a ½ per cent. solution of nitrate of silver and examine the secretion produced as a result of the irritant action upon the mucous membrane. When the shreds are found to contain only epithelium and have no pus cells, and when after the injection of nitrate of silver the secretion is free from gonococci, then there is no indication for continuing the treatment and we can permit our patient to marry. Finger requires three conditions, which consist in the absence of gonococci, of pus corpuscles and of periurethral complications. The most important condition is the absence of the pus corpuscles, because so long as pus corpuscles are found in the secretion the inflammation is not yet extinguished although the gonococci are not present. The positive finding of the gonococcus puts the question beyond doubt, but the negative finding of the gonococcus does not exclude the possibility of its latency. In consequence, the presence of the gonococcus is a sure ground for the refusal of the assent to marriage. But when the gonococcus can no

longer be found we will not give our assent to marriage unless we are thoroughly satisfied that in the secretion and in the shreds are no more pus corpuscles. This is the sign which shows recovery from gonorrhea and places us in a position to promise security against the possible transmission of the gonorrheal infection.

XVII.—THE TREATMENT OF PERI-RECTAL ABSCESSES.

BY JOHN L. JELKS, M. D.,

MEMPHIS, TENN.

My only apology for consuming your valuable time by presenting this seemingly insignificant subject, the Treatment of Peri-Rectal Abscesses, is to be found in all text books on surgery and diseases of the rectum, the inefficient treatment outlined therein and the statement made in some of them that 50 per cent. of all ischio-rectal abscesses result in fistulæ. The neglectful or improper treatment of peri-rectal abscesses, whether of the anatomic relation to the rectum, have within the limited scope of so-called ischio-rectal variety, or those situated in a different my clinical experience, resulted in a great deal of unnecessary suffering.

While thus generalizing it is not my intention to encroach upon the field of genito-urinary surgery only so far as to include circumscribed abscesses not communicating with the urethra or vagina or dependent upon a urethral stricture. No peri-rectal abscess need result in a fistula except perhaps those which are the result of malignant diseases, namely, cancer, tuberculosis and syphilis. In fact then, not to the abscess *per se* can this be the result, but to degeneration of the tissues involved, and the pus infection here becomes a concomitant and complicating process in the case, the gravity of which depends upon the extent and character of infection, the vitality of the tissues and the physical resistance of the subject. Even in many of those which are the result primarily of syphilis or tuberculosis we

can restore the parts to health by early and timely treatment.

Taking into consideration the generally accepted statement that a fistula is the result of an abscess, then the statement of Allingham that fistulæ are more common than are hemorrhoids, if we then accept as true the belief expressed by Cripps that 50 per cent. of all ischio-rectal abscesses result in fistulæ, we must recognize first the great frequency of abscess formation about the rectum; second, the importance of prompt and adequate measures for diminishing the patient's liability of having a fistula.

I have treated a number of abscesses in this region in the past few years, and the invariable result has been early and complete recovery, therefore the statistics of Cripps, Allingham, Mathews and others have led me to believe that the technique which I now practice and have for the most part practiced for four or five years, is responsible for some recoveries. The fault to be found in a simple incision and drainage in these abscesses is that their walls are not gotten rid of, hence nature most often equal to the task of absorbing or otherwise throwing off this barrier to general infection or infection to deeper structures, so generously supplied in this locality, seems unable to do so here, and as in many instances the abscess wall becomes calloused, all efforts to establish granulation are futile. This foreign substance remains to irritate and cause suppuration.

The rational idea of treating a septic endometritis is first to destroy the diseased endometrium, hence the usefulness of the handy curette. Is the same not rational here? I hold that it is so, and in the treatment of the two conditions I would make no special distinction.

Anesthesia is another essential effect to be attained in the treatment of these cases, than which there is but one object of the surgeon more essential and that one is to be mentioned later, general anesthesia is always to be preferred, while in the case of superficial abscesses local anesthesia will suffice for hasty though thorough operation. Small superficial abscesses may be frozen and excised as would be a small tumor. Where the abscess is very close to the bowel, general anesthesia and thor-

ough dilatation of the sphincters are essential and should never be omitted.

As soon as I am able to elicit fluctuation—and I dislike poulticing to accomplish this end—I open freely down to the bottom of the abscess, parallel with the rectum, and usually transverse to the folds. I then irrigate with a formalin solution through an irrigating curette attached to a fountain syringe until the fluid becomes very clear. In this way I make sure that I will not infect healthy tissues in the path of my curette. Thus ends the efforts of most operators, when indeed the important step begins. I then with a sharp irrigating curette fearlessly and surely remove all the abscess walls, thereby converting this cavity into a surgical wound pure and simple, continuous irrigation with formalin solution is allowed through the curette until the operation is complete.

The rectum is thoroughly dilated then and washed clean with formalin solution, any ulcers cauterized and hemorrhoids removed either by the ligature or cautery method. The cavity is then packed with iodoform gauze and dressed again on second day after operation, a weak solution of formalin is used then and every day or two thereafter in irrigating these cavities. After thus operating on these cases and treating them I expect no further suppuration. After the third day the dressing is changed from a dry one to iodoform gauze on which is spread equal parts of balsam Peru and liquid vaseline or castor oil.

Mathews, Allingham and others have advised the use of such agents as bi-chloride of mercury, carbolic acid and hydrogen dioxide in irrigating these cavities, but in my hands they have all proven defective and objectionable. Since using formalin solution in irrigating I have in the after treatment of them seldom noticed suppuration. With either of the previously mentioned antiseptics I have found that however careful I was to cleanse the wound from day to day I would find some discharge when I returned on the following day. With a weak bi-chloride solution—one to four or five thousand—I had the best results. I never liked carbolic acid for the purpose so universally designed, indeed, I think if the solution be strong

enough to kill the streptococcus or staphylococcus or the tubercle bacillus, the same would do damage to the healthy tissues.

I have repeatedly endeavored to obtain satisfactory results from the use of hydrogen dioxide but after the stuff had fumed and bubbled for some time I could wash out particles of pus and debris with fluid used with some force. I have thus endeavored to check the ravages of a chancroidal bubo for weeks without avail, when in forty-eight hours I could have stopped completely the destructive process with a solution of formalin. Suffice it that I have not obtained as good results from the use of other antiseptics as from formalin. If the formalin solution becomes too irritating after a few days' use of it, I use a weak solution of bi-chloride and dress the wound with iodoform or borated gauze saturated with a 50 per cent. solution of antibrule, a combination of carbolic and picric acids and formalin.

I have not found the objections to the use of formalin in rectal and gynecological work referred to by rhinologists and laryngologists.

When abscesses are thus summarily dealt with and dressed daily little fear need be entertained of the 50 per cent. solution resulting in fistulæ as referred to by Cripps and others.

XVIII.—SIMPLE OPERATION FOR HEMORRHOIDS —ENUCLEATION.

BY J. RAWSON PENNINGTON, M. D.

CHICAGO, ILL.

The object of this paper is not to enter into an elaborate discussion of hemorrhoids nor to rehash the literature found in the text books, but to describe in a brief manner a simple operation for the radical treatment of this malady.

Hemorrhoids, according to the investigations of Reinbach, are true angiomata. They are divided into three principal varieties, viz.: Internal, external and interno-external. The

two former varieties may be subdivided still further. The muco-cutaneous junction is the dividing line between the internal and external variety.

Given, for the purpose of illustrating our paper, a case of well developed hemorrhoids of the varieties above mentioned. The second night before the operation I administered from two to three grains of calomel in combination with subnitrate of bismuth and pepsin. The following morning one-half ounce of Rochelle or Epsom salts. At 9 o'clock the night before the

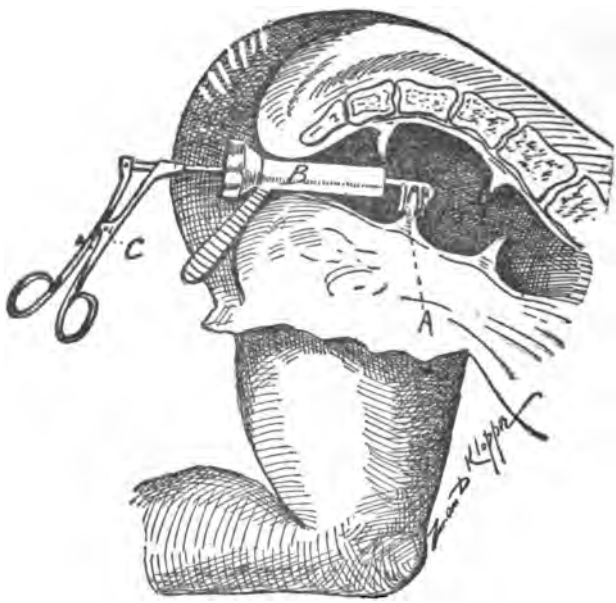

FIG. 1. The application of an automatic valve clip to a pathologic *plica trunsversalis recti* (valve of Houston). A, is the clip; B, the speculum; C, the applicator.

operation shave the anus and give a bath and a colonic flushing. At 7 o'clock the following morning I give an enema of from one-half to one pint of cool water and operate two hours later. This method of preparation gives a clean field in which to operate. The patient being anesthetized is placed in the Sims posture upon a table which I have designed especially for rectal surgery. The sphincter is then gently and carefully divulsed with the fingers and the rectum irrigated with an antiseptic

solution, usually bichloride of mercury, 1 to 3,000, followed by sterilized water. In the next step a strap is placed over the patient's right shoulder to prevent his slipping and the table tilted so as to place him in the proctoscopic posture, a position equivalent to the extreme Sims or knee-chest posture. A tubular speculum is then introduced and the entire rectum, valves, chambers and part of the sigmoid carefully examined. If any tumors, deformities or obstructive valves are noticed, immediate attention is given them. If polypi are present they are ligated and removed. If the patient has given a history of obstinate constipation and I find that one or more of the rectal valves are obstructive to the free evacuation of the

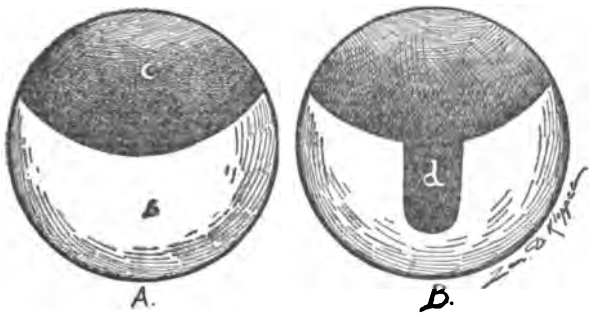

FIG. 2. In A, *b* shows the appearance of the valve before being divided; *c* the lumen of the bowel above the free border of the plica (b). In B *d* illustrates the appearance after a section has been removed by the clip.

bowels I apply an automatic valve-clip to the pathologic condition. Fig. 1. By means of the clip the valve is painlessly and effectively divided by pressure necrosis which not only removes a section of the valve and relieves the obstruction, but greatly increases the caliber of the bowel at this point. (Fig. 2.)

All surgeons have noticed that many of their patients suffering from hemorrhoids are more or less obstinately constipated and that after the operation for hemorrhoids some are relieved of the constipation while others are not. Since following the above routine method of examination and treatment, I have been much more successful in relieving the constipated condition in connection with the operation for hemorrhoids. The table is then returned to its normal position and the patient

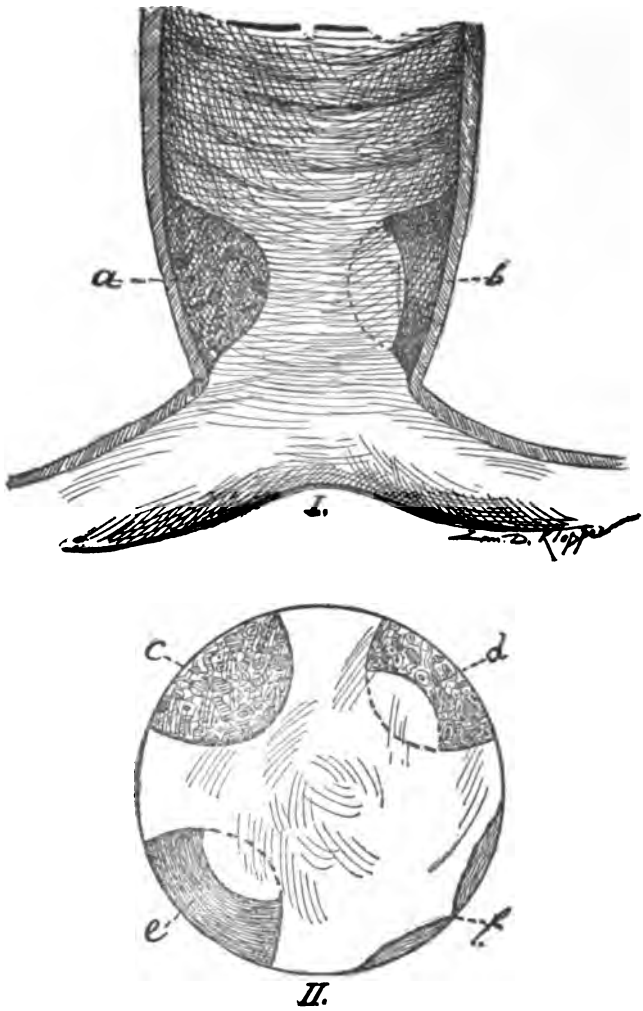

FIG. 4. I Mesial section (schematic) illustrating a hemorrhoid (*a*). The uppermost one-third (*b*) has been cut off, and the angiomatous tissue removed.

II. Composite view; *c* represents the hemorrhoid; *d* uppermost one-third removed; *e* angiomatous tissue enucleated; *f* collapse of the remaining wall which covers the operated field.

retained in the lithotomy posture by means of the Clover crutch. The rectum is now reirrigated and each anal quadrant grasped at the muco-cutaneous junction with a pair of T forceps. These are held by an assistant. By means of these instruments the anus is everted and the internal tumors exposed. (Fig. 3.) Now seizing with the full hand the forceps attached to the posterior quadrant, I fully evert it and with a pair of scissors curved on the flat cut off the redundant tissue only, which is usually about one-third or one-half of the uppermost part of the hemorrhoidal node. This permits most of the blood in the tumor to escape. All of the angiomatous tissue is carefully removed when the remaining wall collapses. This leaves a very small area, if any, of denuded surface. (Fig. 4.) Each quadrant in regular order is treated in like manner. A stream of hot sterilized water flows over the field continuously during the operation. Spurting vessels, if any, are caught with a pair of forceps and thoroughly twisted. Should this fail to control the hemorrhage would throw a ligature around the vessel and ligate it. So far have not found this necessary. The T forceps are then removed and all external tumors and tabs of skin cut off with a pair of straight scissors, care being taken not to make an incision in the muco-cutaneous junction, when it can be avoided, as this is the most sensitive point around the anus. This same precaution should also be observed when removing the internal tumors. The field is then dusted with nosophen powder and a rubber-covered tampon introduced through a bi-valve speculum. (Fig. 5.)

The tampon is made by taking a piece of ⅝ or ¾-inch rubber tubing about 4½ inches long and passing through one end a string for anchoring purposes and over the other the small end of the rubber cover. (Fig. 6.) A ligature is usually wrapped around this two or three times and tied in order to make it more secure. (Fig. 7.) This, tube and cover, is placed in the vessel with the instruments and sterilized after which the rubber cover is unrolled. (Fig. 8.) Gauze is then wrapped around the tube until as large as desired. (Fig. 9.) The next step consists in unrolling the cover over the gauze which completes the tampon. (Fig. 10.)

The tampon is allowed to protrude about 1½ inches beyond the anal orifice. Gauze is carefully wrapped around the protruding portion and packed close to the anus. (Fig. 11.) The anchoring string is wrapped around a piece of gauze held close to the end of the tube so as to prevent its slipping into the rectum. Over this is placed gauze, cotton and a T bandage. Care should be taken that the T bandage is made quite taut. The patient is then placed in bed.

By operating in this manner there are no tender and obstructive stumps to slough nor nerves caught and squeezed, which produces most excruciating pain, as there are when the ligature method is used; nor are the nerves and tissues burned to a crisp, which is also painful, as when the clamp and cautery are employed. In lieu of this, a fibrinous exudate is deposited over the operated field, which exudate is neither destroyed nor disturbed upon removal of the dressings. Moreover, the danger of stricture is obviated, as the normal caliber of the bowel is left practically covered with mucous membrane. Neither is the anal orifice contracted as it necessarily is after either of the above operations.

At the end of forty-eight hours the patient is given a cathartic and the tampon removed. Removing it is easy and painless. The movement of the bowels is also painless and there is, as a rule, little or no bleeding. Favorable reports upon the use of this dressing have been made by a number of surgeons, among them may be mentioned, Dr. J. Wesley Boveé, Washington, D. C.; Dr. J. Chalmers DaCosta, Philadelphia; Dr. William A. B. Sellman, Baltimore; Wm. M. Beach, Pittsburg; Dr. Howard Crutcher, Chicago, and many others.

From this on until convalescence is well established the parts should be washed or irrigated twice a day with an antiseptic solution, and dusted with some powder as iodoform, boracic acid or nosophen. I have used the latter drug almost exclusively for the last eighteen months and prefer it to either of the others. It is not so irritating as boracic acid nor has it such an indestructible and offensive odor as iodoform. In fact, because of its odorless, antiseptic, hemostatic and anesthetic prop-

FIG. 3. Illustrating the application of the forceps.

FIG. 5.

erties, it seems to me to be peculiarly and especially adapted to rectal surgery. After the bowels have moved the patient is instructed to keep them soft for two or three weeks. For this purpose I frequently prescribe compound liquorice powder. If they object to its sweetish taste, as some do, I then suggest Apenta water, which is very palatable and effective. Should they complain of pain or an aching sensation, a hot sitz bath of twenty minutes is given. As a detergent, small pieces of wet cotton or cottonoid are used. Paper and other hard and rough substances are interdicted.

I prefer the rubber dressing to gauze and other porous materials because,

1. It is neater.
2. Its removal is painless.
3. As the tender granulation sprouts cannot penetrate it as they do the gauze and other porous dressings, they are not broken off during its removal neither is the fibrinous exudate disturbed. Hence, the healing process is greatly enhanced.
4. Another advantage, and one of no little moment, is that there is but little or no pain during the first and subsequent movement of the bowels.

This method of procedure which I have now employed in about fifty cases, has been so far more satisfactory than any method previously used. It is very quickly and easily performed. Patients suffer little or no pain; are out of bed in a week and often in less time; in fact, I have had two patients occupy the same bed consecutively in one week.

The tampon covers are made by the Miller Rubber Manufacturing Company, Akron, Ohio.

XIX.—DISEASES OF THE SIGMOID COLON.

BY WILLIAM V. LAWS, M. D.

PHILADELPHIA, PA.

There is an enormous amount of literature upon the diseases of the rectum, the diseases in the region of the cecum, and other portions of the alimentary canal; but comparatively little has been written upon the diseases of the sigmoid flexure. The reason for this is not that this portion of the large intestine has gone unrecognized, as a frequent seat of disease, but is because the diagnosis of incipient pathologic processes taking place here was impossible with any degree of certainty, until quite recently. Before the introduction of the modern sigmoidoscopes, and before atmospheric inflation of the bowel had been demonstrated as practical, the surgeon had to depend upon vague symptoms of reflex pain, discharge of mucus, blood and pus, together with constitutional symptoms, in drawing his conclusions of disease in this region.

To illustrate this point, I will relate the facts of a case, occurring in 1890, which made a strong impression upon my mind, since the patient was the father of one of my most intimate boyhood friends. He was a man about fifty years of age, and to all appearances was the picture of perfect health. He was a short, well built man, of ruddy complexion and in good flesh. The symptoms referable to the bowel were constipation, which had lasted about one year, and had gradually increased in severity, together with a sense of pain and uneasiness, in the left iliac fossa. On going to stool he would frequently pass mucus, or mucus and blood. He was engaged in a large manufacturing business, which required very close application, to which he attributed the constipated habit, and consequently was not concerned in regard to himself, until he noticed the passage of blood and mucus with his stools. His family physician induced him to consult three distinguished surgeons, each one being from a different city. That there

may be no doubt that he consulted eminent authorities, I will say that all of the surgeons consulted are prominent members of the Mississippi Valley Medical Association. He was given a very careful examination by each one of them, who used all the different methods known to the profession at that time, yet they all failed to make a proper diagnosis of the case. One expressed himself as suspecting a malignant tumor, while the last one he went to see advised him to go home, attend to his daily business and "forget himself," telling his friends that there was not much the matter with the man. He died a few months afterward, when the autopsy revealed an annular carcinomatous stricture, which had entirely blocked the lumen of the sigmoid flexure.

Doctor Kelsey of New York in 1898 reported a case with a very similar history, only his patient was a much younger subject.

Knowing the difficulty these men of undoubted skill and experience had in diagnosticating disease of the sigmoid flexure at the beginning of the last decade, we can all appreciate what has been done in the last few years, and what will be done in the near future to clear up the pathology of diseased conditions in this practically unexplored part of the alimentary canal. Today we can make a thorough examination of the sigmoid flexure just as easily as to make an examination of the rectum. There is no doubt but that it requires quite an amount of skill and experience to use the ordinary sigmoidoscopes, with reflected light, as it is very hard to keep the light focused properly, without a good deal of paraphernalia; but by the use of the Pneumatic Sigmoidoscope devised by the author some eighteen months ago, this difficulty is overcome, and any one of ordinary skill can make a satisfactory ocular examination of the parts under consideration.

Quoting from Gerrish's recent anatomy, "The sigmoid colon is the most movable and most variable of the divisions of the large intestine. It is continuous below with the rectum, and most authors fix the dividing line between the two, opposite the joint of the left hip bone and the sacrum. But the result of

many careful observations shows that while the large intestine crosses this articulation in some cases, in the majority this condition does not obtain. Even if the classical description were in accordance with the fact, there would seem to be little wisdom in separating these two territories of intestinal surface by this extraneous and purely arbitrary boundary, thus depriving the sigmoid colon of a portion of intestine exactly like its major part in structure, and bestowing it upon the rectum, from which it materially differs.

"Adopting this method the sigmoid colon begins on a plane of the crest of the left ilium, and thence usually passes down to within an inch and a half of Poupart's ligament, bends sharply toward the middle line, crosses the psoas magnus muscle, dips into the cavity of the true pelvis, rises to the brim on the right side, and thence curves backward, downward and inward to about the third sacral vertebra at the median line, where it is continuous with the rectum. It is fourteen or more inches long. For its uppermost three inches it has a serous covering on its front and sides only; but below this it has a meso-colon in its entire length."

According to Morris' anatomy "The sigmoid meso-colon measures from one and a quarter to three and a half inches in width, *i. e.*, from the parietes to the bowel. There is often no meso-colon over the psoas, the gut being adherent to that muscle."

Byron Robinson in some three hundred adult autopsies found that the meso-sigmoid possessed peritoneal adhesions, over the psoas magnus muscle, in over 80 per cent. of subjects. He attributes this condition to the traumatic action of the psoas muscle on the sigmoid flexure, at times when it contained virulent germs, inducing the migration of the germs or their products through the gut wall into the peritoneal surface, producing a plastic peritonitis.

In structure the sigmoid flexure and the rest of the colon, of which it is only a part, has four coats, the same as the small intestine, serous, muscular, submucous and mucous.

Considering only the mucous coat, which presents, when the

bowel is inflated and illuminated by the direct rays of the electric light, a bright red, smooth appearance, being destitute of villi. It contains the glands of Lieberkühn, and some nodes of adenoid or lymphoid tissue. The very shape of the sigmoid flexure suggests the physiologic purpose for which it is intended; that of a place of retention for the non-absorbable and refuse contents of the large intestines until a convenient time for it to descend into the rectum and be immediately expelled. It was formerly thought the feces constantly accumulated in the dilated portion of the rectum, where they remained until an evacuation took place; but the "arguments of O'Beirne against such a view are conclusive." Every rectal surgeon knows, from making repeated examinations, that the rectum seldom contains either feces or gas. Nature again shows her wonderful wisdom in placing this portion of the bowel, which is more or less filled all the time, in such a protected position from external injury.

Inflammation of the sigmoid.—The mucous membrane of the sigmoid flexure, like mucous membrane elsewhere, is subject to acute and chronic inflammation. In acute catarrhal sigmoiditis, no structural change takes place in the wall of the bowel, nothing but congestion, with an increase of mucus and exudation of serum. There may also be moderate bleeding from the surface of the inflamed mucous membrane. This condition as a rule runs its course in a short time, and the patient gets well. We have no satisfactory knowledge of its causation, the condition, however, is probably brought about by acid fermentative changes in the retained feces.

Chronic sigmoiditis very frequently follows in the wake of the acute inflammatory process, and when it does the excessive production of mucus continues, the connective and muscular tissue of the bowel becomes thickened and the glandular elements are also more or less involved. The patients have frequent passages of mucus, fluid feces, and sometimes bloody stools. They lose flesh and strength and became generally debilitated. This condition may last for quite a while, if not properly treated.

There is another form of subacute or chronic sigmoiditis, which is of undoubted nervous origin. This variety is generally met with in persons who have passed through some excessive nervous strain, or who have sustained some grave disappointment. In this type of the disease there is also an excessive production of mucus; but there are no anatomical changes in the wall of the bowel. The feces are sometimes formed, sometimes fluid. These patients are always markedly neurotic, and suffer with vague pains or tender spots over the abdomen, which are not constant. Some suffer with reflex headache and the majority of those I have observed have had a marked tendency toward hypochondriasis. In a recent issue of the London *Lancet* Mr. E. H. Freeland explains this condition in the following way: "There is a nervous depression which causes a diminution of functional activity generally, in which the cardio-vascular system shares, causing a tendency to a general venous congestion, and especially in the great venous system connected with the liver—the portal vein and its tributaries. This in turn, working backward, causes congestion of the whole gastro-intestinal tract. On account of the pressure and irritation of the retained partially dried feces, in process of time a catarrhal condition is set up with a tendency to the secretion of viscid tenacious mucus and the other attending symptoms. At one end of the line there is worry which may be considered the prime factor, and at the other end worry on account of the pain, discharge of mucus, etc., as the ultimate factor in the case."

Ulceration of the sigmoid.—When much blood and especially when pus is noticed with the stools, we know that the disease has progressed a step further than inflammation, and that ulceration has taken place. Besides the catarrhal ulceration the sigmoid is affected with a simple ulcer, which takes place in a similar manner to that met with in the stomach and the duodenum. The patients suffering with this form of the trouble are generally subjects of nephritis or other forms of visceral disease. Typhoid ulceration may also take place in the sigmoid, which when healed leaves the bowel in a weakened

condition and no doubt accounts for some of the chronic diarrheas which are sequels of that disease. Tubercular ulceration when it affects this portion of the bowel may progress until perforation takes place, or it may heal and be the cause of stricture. When we consider the physiology of the sigmoid we must recognize the tendency to abrasions of the mucous membrane, when the feces become hardened and dried.

If the patient be the subject of secondary syphilis, we can readily conceive how such abrasions might be the cause of specific ulcerations. Mathews says: "I have seen cases of undoubted syphilitic ulceration of the rectum and sigmoid flexure where no other evidence of the constitutional affection existed.

Carcinoma of the sigmoid.—According to Sutton ten per cent. of all carcinomas of the intestines have their seat in the sigmoid flexure. Dennis' System of Surgery states that "Carcinoma of the large intestine is essentially an irregular and progressive proliferation of the epithelial cells, originating in the normal glandular structure, the follicles of Lieberkühn, the new tissue infiltrating the submucous tissue and early undergoing inflammatory and degenerative changes. It may be impossible in its earliest stages to clinically distinguish an adenomatous from a malignant tumor. The latter sooner or later has a tendency to a broadening infiltration at its base, which marks it at once as a carcinoma." The irritation of the fecal matter, which normally rests in the sigmoid for a period, soon causes a superficial necrosis of the nodules, which causes an additional inflammatory thickening of the tissues surrounding the tumor. On examination through the pneumatic sigmoidoscope the tumor may project as an irregular lobulated mass from the mucous surface of the bowel, with a broad yet circumscribed base, or, on the other hand, it may entirely surround the lumen of the bowel without projecting much above the mucous surface. If such is the case, the bowel will not inflate at this point, and a slight constriction of the lumen will appear, or it will be entirely obstructed. The symptoms of carcinoma of the sigmoid are very insidious, and are not

marked in character until the lumen of the bowel becomes encroached upon, when constipation alternating with diarrhea occurs. The patient, as a rule, complains of slight pain or a sense of uneasiness in the left iliac fossa. Emaciation does not always take place, until the later stages of the disease. The fact that patients remain in such good flesh oftentime militates against the diagnosis of malignant disease being made. As soon as ulceration takes place the stools will contain mucus, blood and pus. Very seldom the presence of a tumor through the abdominal wall may be made out by palpation. The only positive means of diagnosticating malignant disease of the sigmoid is either by the use of the sigmoidoscope or by an exploratory laparotomy.

Volvulus.—The sigmoid flexure is the most common site for that form of obstruction known as volvulus or twist occurring in this location in about fifty per cent. of all cases. The twisting of the bowel may take place about its mesentery, or around its own axis. An unusually long mesentery predisposes the sigmoid flexure to this accident. As it usually affects persons past middle life, the cause is easily explained by supposing that the upper part of the flexure, from habitual constipation loses its natural tone and becomes dilated, then on filling with fecal matter, it is very easy to understand how it would drag upon its mesentery and cause the characteristic kinking or twist. This pathologic process is usually of a gradual formation, yet it has been known to suddenly follow violent exercise, or from a blow upon the abdomen. In such a case the traumatism would be followed by a temporary paresis of the bowel which would immediately dilate and fill with fecal matter, and cause the twisting in the same manner as in the more chronic form.

Treatment—As the acute form of catarrhal sigmoiditis is very seldom differentiated from other diarrheal diseases, it is generally treated by rest in bed, saline purges, etc. When the diagnosis of the condition is made out, the bowel should be treated locally, by irrigating it with some mild antiseptic solution, or as a bland material for injection the infusion of flax

seed is to be recommended. In the treatment of the sub-acute or chronic sigmoiditis, the first effort should be directed toward getting the bowel thoroughly cleansed not only of the retained fecal matter but of the glairy, tenacious mucus, which clings to the mucous membrane and is sometimes very hard to dislodge. I know from personal observation that it is impossible to thoroughly cleanse the sigmoid by the use of salines, as I have on several occasions examined the sigmoid of patients who had been given saline cathartics, with that idea in view, and each time I have found quite an amount of mucus coating the inside of the bowel which the repeated action of the saline had failed to bring away. Local treatment in the form of high injections and repeated irrigation given either through a Wales bougie, or a return flow colon tube, is the only certain method for removing this material.

The administration of high enemas, through the rectal bougie, or colon tube should not be entrusted to inexperienced nurses, or members of the patient's family, for it is possible not only to aggravate the existing trouble, but to set up additional inflammation, and also cause the formation of ulcers by the unskillful introduction of the tubes. It is not necessary to use a larger size than a No. 3 Wales bougie, in giving a high enema, as it should enter the sigmoid easily and without giving the patient any pain, otherwise the bougie is doing more harm than the treatment will do good. After the bowel has been thoroughly cleansed by the above treatment, it should be irrigated with some stimulating or astringent solution, such as fluid hydrastis, pinus canadensis, weak solution of bichloride of mercury, 1-10,000, silver nitrate, etc.

A sigmoidoscopic examination should be made at least once a week, so as to note the progress of the treatment, and at such times stimulating applications of nitrate of silver, balsam of peru, etc., should be made to any ulceration present, and the entire mucous membrane sprayed with some stimulating or astringent preparation. Rest in bed, with a soft diet will also aid in the treatment. Patients in whom the nervous element is quite a factor should not be confined in bed any length of

time, but should be encouraged to remain in the open air, and should be advised to leave off their business cares, or the cause of their worry should be removed if possible. Very often it is necessary for this class of patients to have an entire change of scene before they are relieved. If this line of treatment be carried out intelligently, the majority of patients suffering with sigmoiditis may be cured and all will be benefited.

The only ideal treatment of carcinoma of the sigmoid flexure of course is excision of the tumor, with an end to end anastomosis of the divided gut. It is true the statistics showing the results after removal of the sigmoid flexure, so far are anything but flattering; yet when we consider that nearly all of the operations have been undertaken for symptoms of acute obstruction of the bowel, at a time when there was great distention of the bowel above the growth, and when the patient was in the worst possible condition for such an operation, it is quite natural for one to ask the question, "Might not the results of many of the operations have been different, had the diagnosis been made and the patient operated upon before the acute symptoms intervened?" There are three indications in the favor of early removal of the sigmoid flexure for a malignant growth: First, the growth always starts in the glandular elements of the bowel, and does not spread to surrounding tissues immediately; secondly, the lymphatic glands are not involved for some time after the symptoms begin; thirdly, there is no portion of the intestinal tract that can be sacrificed with the same degree of immunity from important functional disturbances, since the physiologic purpose of the sigmoid is principally a reservoir.

When the time for resection is passed colostomy is to be considered as a "dernier ressort."

In the treatment of volvulus there is only one method worth trying, and that is immediate laparotomy, with replacement, and anchoring of the gut to the abdominal wall.

In this paper I have tried to point out as succinctly as possible the various pathologic conditions that may exist in the sigmoid colon, and have made an effort to show that they are all amenable to successful treatment, not even excepting malig-

nant disease, provided it is disgnosticated in its early stages. In order to make out a proper diagnosis of diseases in this region, dependence alone should not be placed upon the various objective and subjective manifestations, but direct inspection of the lumen of the bowel should always be made, through the sigmoidoscope, and in case that does not clear up the diagnosis properly, I believe an exploratory laparotomy would very often be justifiable, so as to permit the bowel to be examined from within the pelvis.

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XX.—OBSTIPATION.

BY STERLING B. TAYLOR, M. D.

COLUMBUS, OHIO.

Obstipation, as its name would indicate, is an obstructive costiveness, and is to be differentiated from functional costiveness, intentional, habitual delay of bowel movement, and constipation. It is a far more common disease than the profession are prepared to admit.

That costiveness which deserves and has received the name of obstipation is dependent upon some mechanical or foreign interference situated in the rectum or sigmoid flexure. Functional costiveness is that condition which may exist as the result of errors in diet or neuroses, exhibiting itself by small daily movements, leaving a residue to accumulate in the intes-

tine. Wirthington (Ref. Handbook of the Medical Sciences) says: "There is no sharp line separating constipation from health." We claim there is a very clear line separating obstipation from the two lesser evils, constipation and functional costiveness, hence sharp demarcation between health and obstipation.

In constipation there is a sluggishness of peristalsis which consequently delays bowel movement, but eventually there is an effective and satisfactory effort at defecation. Just the reverse of the latter proposition is true in the condition under discussion, as there is a constant unrequited desire which is only partially relieved by using such adjuncts as physic and enemata, producing a stool which is either liquid, semi-solid or tape-like in form, and which leaves still that uncontrollable desire for further and complete defecation.

The name obstipation is derived from two Latin words, *ob* meaning "against" and *stipo* to "stuff or cram." We therefore have in obstipation a stuffing or cramming against an obstruction which may be found under any one of the following heads:

First—Compression from without.

Second—Blocking up of lumen of canal.

Third—Constriction arising from disease of gut wall.

Fourth—Hypertrophy of normal rectal valves, with consequent interruption of lumen of canal and accompanying distortion of gut above obstruction, the latter condition begetting an atonic state.

Ross, in discussing Obstruction of the Bowels, classified the causes under the first three of these heads, but failed to find the fourth and most important cause, which we place under the fourth division. We will give but brief attention to the first three and confine ourselves principally to the fourth topic: First. Compression from without may be caused by carcinoma or sarcoma involving adjacent organs with the infiltration; by enlarged prostate or malposition of uterus and other organs; by adhesive bands which bind down the gut, thus decreasing its caliber, etc. We have in mind one case in which proctoscopy revealed post-operative adhesions. A few weeks ago we saw

a sarcoma of the sacrum and ilium which produced a decided narrowing of the lumen of the retum.

Second. The lumen of the canal may be occluded by foreign bodies introduced either per ora or anum, or forming within the personal economy. This includes an endless category of bones, buttons, nuts, fruit-pits, metallic substances and possibly gall stones.

Third. Constrictions may arise from benign disease of the gut-wall, such as dysentery, adenoids, and the specific diseases —syphilis and tuberculosis—and from carcinoma and sarcoma.

We now come to the fourth cause of obstipation, the hypertrophy of the rectal valve. To quote Martin, "one must go to the histologist and not to the mechanical engineer for the definition of an anatomic valve." He tells us that Shaffer and other histologists agree that an anatomic valve is composed of a superficial layer of epithelium, next a layer of fibrous tissue, and at the base circular muscular fibers. Martin has made sections of many rectal valves, and found that "the most typic partake of the character just mentioned, while many are atypic; some contain fibers from the longitudinal muscular coat; many have a paucity of fibrous tissue; in others the fibrous element appears to be far removed from the mucous free border of the valve, and in others the circular muscular fibers may be sparse or in abundance."

The rectal valve spans half the diameter of the rectum, is semi-lunar in shape, and must be considered as an anatomic entity in studying the mechanism of defecation. The existance of the normal rectal valve must no longer be doubted. Dr. James F. Baldwin, in discussing a previous paper by the writer on this subject, says: "As to these rectal valves, I have seen them in the dissecting room, sometimes well marked, sometimes indistinct. When, therefore, Dr. Martin first described them and brought them in as pathological factors in the production of obstipation, I accepted his statements with full credence." Cooke, Pennington, Earle, Gant and in fact every man who has had the opportunity to see a valve, either ante or post-mortem, is thoroughly convinced of their existence.

Gray and Morris, authorities whom all recognize, state that the rectal valve is an anatomic factor worthy of consideration.

As a rule, there are three valves, but there may be either more or less. One case I remember seeing in which the number was seven. All people, with the usual exception to the rule, are given the normal rectal valve. Every organ of the body is subject to pathological change, and these structures get even more than their share, as their position is such that they are continually exposed to violence. The latter may be taken to mean traumatic, such as the injury to a valve by the passage of some rough or irritating body, or their immersion by poisonous or acrid discharges. Adding the cases arising from the above causes to those cases of congenital malformation, we consider that we are justified in giving special prominence to the fourth cause of obstipation, before mentioned.

One needs to see a demonstration of the existence of the normal valve, and then to see one that has been thickened and enlarged to appreciate and understand how these valves may not only induce constipation but actually become the obstructive agent in obstipation. Martin, Cooke, and the writer have on previous occasions very properly claimed that it is the office of the normal valve to beneficially retard the descent of the fecal mass. We know this proposition will hold good, because we have by practical work demonstrated that the function of the rectal valve is to support any matter that is voluntarily or involuntarily placed on its upper surface. We have frequently seen accumulations of feces, mucus, water, and after surgical operations, blood, retained in the pocket or on the valve shelf. For example, take a valve that we know to be one that obstructs; place a marble, a pledget of cotton, or some other substance on the upper surface of the valve, and it will remain there until removed. Or pass a hook over the valve, make traction at right angles to the valve and it will not be effaced. After section of such a valve has been made by Martin's method, any similar foreign body will be retained on the valve with great difficulty.

One valve may cause all the trouble. Usually two are at fault, but all may be affected.

How may we know that it is an hypertrophy of the rectal valve that causes obstipation? By taking a complete history of the case, arranging subjective symptoms according to the law of cause and effect, make a presumable diagnosis, then examine or have an examination made with the proper method and instruments. The unequipped will find that it will be frequently impossible to confirm or disprove their diagnosis, as it is futile to attempt to see even the first valve with the older methods, even under anesthesia. One of the best surgeons in the state of Ohio attempted to explore this field with the finger and with the ordinary speculum without an anesthetic; then anesthetized the patient and employed the same means, still with a negative result. The patient was then sent to us. He was placed in the Martin posture, the Martin proctoscope was used, bringing the entire field into view, from the levator ani to the third chamber of the rectum, showing an anatomic coarctation of the first and second valves. Their propinquity was such as to offer almost a complete obstruction. The third and fourth were also found to be hypertrophied sufficiently to render a valvotomy necessary on all. This man's obstipation had continued for six years. A complete history of the case may be found in the Columbus Medical Journal, November 20, 1899.

It is often difficult in this class of cases to be able to say just how much of the trouble depends on hypertrophy of the valve and how much is caused by the consequent angulation of the gut due to dilatation. Frequently valves are found which are complicated by an angulation and it requires considerable practice to be able to dispel the latter so as to properly measure the trouble caused by the former. No man can become so expert in this line of proctological work that he can essay to do away with the obstructive agent without proper tests and examination. But as a rule, even the inexperienced would have little trouble, with approved instruments and position, in being able to see the semi-lunar valves that span half and sometimes more of the circumference of the gut.

We recently saw and operated a male patient for Dr. Morgan,

of Washington C. H., O., in the presence of his own physician, Dr. Shriner, and Dr. J. I. Davis, of Shawnee, Ohio. In this case there was a condition which would almost be analogous to the annular hymen, with which all are more or less familiar. There was a slight interruption anteriorly of about one-fourth inch. The operation was successful, the valve section radically relieved this patient and he is now no longer constipated.

Other men, Martin and Cooke especially, can doubtless give just such instances in their own practice. If this case could only have been seen by doubting medical men, there could have been but one verdict coming from all—that the rectal valve does exist. Those who do acknowledge the existence of these valves and that they are normal structures, will doubtless be willing to agree that we may have a pathological condition existing at some time, such as an ulceration, edema or atrophy. If this can be granted, as it should be, it would not require much more work for the average mind to say that there can be a hypertrophy.

If the normal valves retard the descent of feces beneficently, it is very plain that a valve increased in size to such an extent as to become pathological would be malicious in its hinderance of the descent of the normal contents of the bowel.

Symptoms. The existence of hypertrophy of the rectal valves is evidenced by obstipation. This condition is, as its name would imply, an obstructive constipation and presents "classic" symptoms, which we shall try to enumerate in a simple and clear way:

First—Chronic irregularity of bowel movement.

Second—Frequent, partially successful attempts to evacuate the bowels; stool flattened laterally.

Third—An inordinate desire for successful defecation.

Fourth—A feeling of distension over course of colon, more marked in descending segment, and at the colo-sigmoidal angulation, or over this point there is actual pain preceding an evacuation.

Fifth—Inability to pass gas freely and when gaseous distention is great, pain is felt over course of genito-crural nerve; aching in sacral region and down thighs.

Sixth—Mucus discharged independently or clinging to the fecal mass, clear, dirty or sanious in character.

Seventh—Evidence of auto-intoxication, which may be and usually is manifested by headaches, neurasthenia, melancholia, anemia, insomnia, morning temperature subnormal; 4 p. m. temperature 99 degrees—99.8 degrees.

Eighth—The appetite is fitful, tongue bearing white coat which refuses to be removed by frequent washings.

The above eight classifications of subjective and objective symptoms would warrant a presumptive diagnosis of hypertrophy of the rectal valves. This may be proved to be correct or incorrect, as the case may be, by a painless exploration of the rectum with the proctoscope. This is accomplished by placing your patient in the Martin posture (modified knee-chest), having previously made preliminary examination to make sure that proctoscopy would be admissible. Select proctoscope No. 1, insert obturator—warm instrument—place point against anus, order patient to bear down, and insert. Withdraw obturator, when rectum will be seen to balloon, exposing its entire mucous surface below first valve and the valve itself, when each valve may be successively and successfully exposed and tested.

The treatment of hypertrophy of the rectal valve may be palliative, in the shape of massage, enemas, diet, etc., or radical. Radical treatment consists in a division of the free border of the valve, which is rendered tense by a band of fibrous tissue. In some cases operated by the writer the band offered almost as much resistance to cutting as cartilage would. After division of the free border is made, the incision should be continued down almost to the gut wall, great care being taken not to overreach the safety limit. Sutures should be placed one in angle of wound, one on either side, to avoid hemorrhage and union by granulation. A tampon of surgeon's cotton wool, dusted lightly with Monsel's powder, may or may not be introduced as a further guard against hemorrhage.

After treatment consists of daily lavage and strict attention to diet, allowing only those articles of food that do not produce gas or a solid stool.

This operation is one of the most delicate in surgery and should not be undertaken by any one without proper equipment and thorough knowledge in technique.

DISCUSSION.

DR. JOSEPH M. MATHEWS, of Louisville, Kentucky.—Mr. President: I have been much interested and entertained by these three papers. I believe that the object in all medical societies should be, at least, to clearly elucidate subjects, agreeing with men when we can, disagreeing with them when we cannot. The paper of Dr. Jelks, on perirectal abscesses, I want to commend highly. Mr. Allingham, in his splendid work on diseases of the rectum, says that to cure a complicated fistula in ano requires as much surgical knowledge and dexterity as to effect a cure in any surgical affection. You, gentlemen, who have operated in this field recognize that this is true. No man can say that he can cure a fistula that is complicated by the first operation. The longer I deal with these subjects, the more I am convinced of the truth of that assertion. Therefore, if we can prevent fistula, as the doctor tells us, we should certainly do so. When Cripps and other authorities say that 50 per cent. of abscesses around the rectum and I am sure that this has been the percentage in my own practice) result in fistula, surely we ought to be able to prevent it, if Mr. Allingham states the truth that they are so difficult to cure, and the destruction by fistula in this region so great, and we all recognize that the destruction is very great outside of the infection of the general system, then the doctor gives us exactly, in my opinion, the treatment of abscesses found in this region. I do not know whether he said he would use an anesthetic or not in his treatment.

DR. JELKS—Yes, sir.

DR. MATHEWS (resuming)—I deal with these abscesses after the manner of Dr. Jelks, and I am sure but if we all did this we would reduce the percentage of cases very materially; I do not know that we would prevent it entirely. I believe his suggestion as to the use of formalin is a good one. I have not used it as often as he has, but I have done so several times, and I agree with him that it is preferable to a solution of the bichloride of mercury or even the peroxide of hydrogen.

Dr. Pennington has given us a valuable paper. A number

of years ago Mr. Allingham said that the ideal operation for hemorrhoids was by excision of the tumor. There can be no question about that. But Mr. Allingham tried to excise these tumors, and had such a profuse hemorrhage following the operation that he abandoned it, giving as his reason that it was so difficult to control hemorrhage after the excision, that he went back to the old method of the ligature. When we remember that internal hemorrhoids are often, if not generally, supplied by an artery as large as the radial, and if we do not secure it by ligature, but rely upon a tampon, hemorrhage will very naturally take place.

Professor Edmund Andrews, of Chicago, has written to a number of surgeons in the last few days in regard to this very point. I received a letter from him yesterday, asking me to tabulate, if I could, my fatal cases of hemorrhage from ligating internal hemorrhoids. If you have a fatal case of hemorrhage from ligating hemorrhoids, what will you have by simply excising them and not ligating the artery at all? Dr. Pennington may be so expert (and I know that he is an expert operator) as to secure these vessels by torsion, as he says. Personally, I would rather have a ligature around them. Dr. Pennington says that he uses his tampon for this purpose, but he admits himself that the tampon slips out and that it is difficult to keep it in place. There cannot be much pressure about a tampon that will slip in the manner that this tampon does. If I were to excise hemorrhoids after the method practiced by Dr. Pennington, I must confess that I would not be able to sleep the night following such an operation. In the City Hospital of Louisville a few years ago, a man bled to death after the operation by ligature. Dr. Gross reports a case of death by hemorrhage in Louisville, when he practiced surgery there, after the operation by ligature. Dr. Andrews is collecting to-day the statistics in this country, if not in Europe, of fatal hemorrhages after the ligature. If all of us were to adopt the method of Dr. Pennington, then, in my opinion, Dr. Andrews would have a great field for investigation. Had Dr. Pennington confined his paper to his subject, I would end my remarks here, but he did not. He stated when he operates for hemorrhoids, and very correctly so, that he searches the rectum for other things, as, for instance, polypi, and removes them. Very correct. If any of the valves were diseased he would likewise practice valvotomy, with his clamp, and then he would excise the hemorrhoids. Now, I want to place myself on record as saying that I believe the ideal operation is by excision, and if he or any

other man can excise hemorrhoids and not have hemorrhage, he has done the very best operation. I would suggest that the doctor bring the mucous membrane together and suture it after excising the pile. Dr. Earle, of Baltimore, a distinguished surgeon, has given us an instrument with which he excises hemorrhoids by clamping them and by a running suture secures the mucous membrane, withdrawing the instrument and tightening the ligature, thereby guarding against hemorrhage.

Dr. Taylor has read a paper on obstipation, and deals with the subject mentioned by Dr. Pennington. Obstipation is a good term; constipation is a better one. If you were to go out into the country districts of Kentucky and talk to people about obstipation, I do not believe that they would know what you were talking about. If you were to talk to them about constipation, many a good old country doctor would tell you how to cure it, or to relieve it. I will pay my respects to these valves a little later on. I have searched my anatomies, those that are published in this country and in Europe, and I fail to find any allusion to them except incidentally as the doctor has spoken of. I have collected the authorities on general surgery who have written in the last decade in Europe and in this country, and their chapters on rectal surgery make no allusion whatever to these rectal valves or their importance. I have asked gynecologists, one after the other, ever since this subject has been brought up in the last five years, to give me their opinion on the subject, and they do not believe in Houston's valves. Therefore, our anatomies must be rewritten, and before we can say much about them, I will rely upon what the general surgeon and the gynecologist say, as well as upon our anatomists, as to what they tell us about these so-called valves. But, gentlemen, you know that this is not new. Fifty years ago or more, Mr. Houston spoke of these valves, and they are called Houston's valves. When he announced this fact, there were any amount of gentlemen who investigated the subject, who took the matter under discussion, made careful examinations, and gave us their opinions, and I must say that the question of the existence of such valves was *settled* fifty years ago. I have here the excellent little book written by Dr. Martin on the subject of obstipation, and I have taken the authorities as quoted by Dr. Martin, and I count thirty-eight of the most distinguished writers in Europe, including Germany, France, this country and England—names which most of you would recognize as distinguished authorities, not only in general surgery, but a number of them have written works on diseases of

the rectum, and these thirty-eight eminent authorities pay no attention to these valves as playing any part whatever in causing obstipation. I have written out the list, but I will read from only a few of them.

Mr. Allingham once said to me that one of the best writers on subjects that pertained to the rectum in this country he believed to be Dr. Bodenhamer, who has written extensively and learnedly on many subjects, and among them he has written about Houston's valves. Here is what he says:

"The idea of calling these small folds valves, and then of their becoming relaxed and prolonged, except in a diseased state, so as to form a barrier or an obstruction to the passage of the feces, is, to say the least of it, hypothetical. If ever such cases occur, they must be rare indeed.

"The first anatomist, however, who called especial attention to a valvular arrangement of the rectum, was Mr. John Houston, of Dublin, Curator of the Museum, and one of the administrators in the School of the College of Surgery in Ireland. This he did in a very able practical paper entitled, 'Observations on the Mucous Membrane of the Rectum,' inserted in the fifth volume (1830) of the Dublin Hospital Reports."

After quoting from Houston the above passages, Bodenhamer continues:

"I have quoted quite sufficient from this ingenious author to present him fairly, and I hesitate not to say at once that, in my opinion, he has entirely failed to establish the verity of his statements, that the folds or projections of the rectum are genuine valves; that they are sufficiently strong to bear the whole weight of the fecal mass, and to retard its downward movement and cause it to take a winding direction, and that they exert great opposition to the introduction of the finger, the bougie, or any other instrument not in the shape of a corkscrew.

"The anatomic evidence against the existence of veritable valves in the rectum is corroborated by numerous facts, a few of which I will now adduce:

"I maintain that the irregular folds of the mucous membrane of the rectum, supposed to be valves by the several authors I have named, are not permanent but purely accidental, and are caused by the partial contraction of the intestine. This can be verified by any one by carefully examining this membrane in the same subject on different days, at such time when the rectum is not distended; and these folds will be found each time to be more or less changed in appearance, and to occupy different

situations. Not so with veritable valves anywhere in the body.

"I further maintain that valves, such as described by Mr. Houston, capable of supporting the whole weight of the fecal matter collected in the rectum, and of resisting the introduction of the bougie or the finger, would most certainly be easily distinguishable and demonstrable in the living body; and in the dead body the removal of the organ ought not to obliterate them, but, on the contrary, that they should be capable of being demonstrated easily, and at any period previous to decomposition.

"Veritable valves sufficiently large and strong to obstruct or dam up this inferior extremity of the rectum is simply ridiculous; such never have, and, in my opinion, never can be demonstrated."

I could go on quoting authority after authority, did time permit, and were I to mention the views of Nelaton and Hyrtl, I would be giving you simply supplementary evidence. Van Buren, than whom no author ever wrote more, distinctly said the same thing on this question; Allingham the same; Alfred Cooper the same; Otis the same; Kelsey the same, and last, and perhaps least, Dr. Martin, who has written this little book that I hold in my hand, quotes me on the preface page as saying: "I deny their existence, and if they did exist I would deny that their use was to support the fecal mass. For many years I have searched for these valves and have yet to encounter them. In my opinion, they exist only in the author's mind's eye."

Now, gentlemen, any one familiar with anatomy, any one familiar with examinations of the rectum, knows that when he introduces a speculum sometimes he sees a fold, sometimes he does not. Sometimes he finds the fold in one locality, as these authors have said, sometimes he finds it in another. But after examining many hundreds of rectums, I have failed yet to find them acting as valves. I take Kelly's tube, Laws' instrument, Pennington's instrument, Allingham's speculum, Cooke's speculum, or any other instrument of the kind every day, sometimes six or eight times a day, insert it into the rectum, and examine it. If I find an obstruction to the instrument or to my finger, or to a bougie, I would ask, What have I encountered? A valve? Certainly not, but rather a stricture, which would naturally be an impediment to the finger, or to any instrument, and whenever we do meet with such obstruction we operate for it, but not by valvotomy? I do not know exact-

ly what that term means. But I do know this, that if you, under the premises as stated by Martin, Pennington and Cooke, take out this amount of space in the supposed valve (fold), you run the risk of hemorrhage, and when it has passed the healing point, you have established a cicatricial formation.

A word or two about obstipation. Mr. Allingham, in his work many years ago, called attention to the fact that when he operates for hemorrhoids he divulses the sphincter muscle freely, and in the vast majority of cases of constipated habits, he noticed the habit was restored because of the dissipation of the spasmodic condition of the sphincter muscle. Therefore, I am inclined to think that many times when these gentlemen invert their patients, and introduce their instruments, the simple dilatation afforded here will accomplish this purpose.

In dealing with anything medical or surgical, the most important thing is to give results. So it is results that I would wish to have in this matter. I would give a great deal if I could find a specific for constipation or obstipation. It is the bane of the doctor's life to have women and men coming into his office continually complaining of constipation. But are these gentlemen going to forget that there are many causes for constipation? Cannot the general practitioner tell us that there may be half a dozen causes for constipation, and when he treats these causes, which may be from the liver, the muscular coat of the rectum itself, or due to a neurasthenic condition, or many other conditions, he applies the remedies and overcomes the condition instead of cutting out supposed valves? We can show that simple dilatation will cure some cases of obstipation or constipation; then Drs. Pennington and Martin will show us that a few are cured by valvotomy. I do not know whether this operation will cure or not. But I do know this, that when women suffer from constipation, I have not yet been able to get their consent to invert them completely by means of the Martin chair or any other chair, and cut out supposed valves. When I take Dr. Martin's own book and find thirty-eight of the most distinguished authorities who have ever written upon this subject who disagree with Mr. Houston (and the discovery of these valves was original with him, and not with Dr. Martin) and when Dr. Martin lays such stress on them in causing obstipation, like a true Kentuckian I believe that the majority should rule; therefore, I will await further developments.

DR. C. B. PARKER, of Cleveland, Ohio.—Just a word or two in regard to the paper of Dr. Jelks. He spoke of the use of formalin and of its painlessness. When formalin was first introduced I was very much impressed with its possibilities, for, as you know, its vapor will continue to act long after you have made the application. I have used it in cases of tuberculosis of bone, where we supposed that the vapor continually arising from the moist packing would act upon the germs and would be very efficacious in destroying them. But we soon found that the pain of this method rendered it practically useless. I do not think Dr. Jelks gave us the proportions of the solution he uses. My experience in using it in the strength of one per cent. and even less in abscess cavities and bone cavities has been that it is extremely painful. There is no doubt of its antiseptic and aseptic properties, but it is very painful.

With reference to the paper of Dr. Pennington, I was much interested in his device, if we may so term it, as a dressing in the after-treatment of his case. I think every operator has had to devise something for the after-treatment of the class of cases under discussion. The tampon I use has an opening through which, if hemorrhage does occur, it can be detected. Years ago, in my own practice, I used a piece of solid rubber tubing, surrounding it with gauze. It will not come out, as you can pack it as tightly as you would the "petticoat tampon," so called. You can pack around the tube as much gauze as is necessary. When you wish to remove it, you do so by removing the rubber tubing first. When you remove the gauze, two or three days later, there is no pain whatever.

I live in the city where Dr. Martin practices, and I have seen him demonstrate the rectal valves. I think we are wise not to accept a theory simply because it is new, or to decry it if it does not come within our experience. I am watching the results of this method of practice in our city. I know that there have been fearful hemorrhages from operations upon these valves. The operation is necessarily attended with great danger from hemorrhage. But I feel as a society we ought to hold ourselves in a receptive condition and await, as Dr. Mathews has so eloquently said, the results. It is the results that we are after. None of us would object if these valves are found to be one of the causes of obstipation. Indeed, I do not think Dr. Mathews would refuse to accept it, if it could be clearly demonstrated and established. I have no doubt he would also follow the method of excision of hemorrhoids suggested by Dr. Pennington if he thought it was absolutely safe.

DR. HUGH A. COWING, of Muncie, Indiana.—I wish to say a word or two on this subject, but it would be like carrying coal to Newcastle to attempt to add anything of interest to what Dr. Mathews has said concerning the method of treating hemorrhoids by the ligature. But we in general practice, living in cities of twenty-five thousand inhabitants, such as my own city, Muncie, have no specialists in rectal surgery. Occasionally we can send patients to the larger cities, but most of them must be operated upon by ourselves, and some years ago I found it necessary to study the best method of treating patients who had hemorrhoids, and following the advice of such authors as Dr. Mathews, I began to use the ligature, and in my hands, in a limited experience, it has proven uniformly satisfactory. In the cases I have operated upon I do not recall having a hemorrhage after operation, and the results have been all that could be desired. I therefore wish to place myself on record as favoring the operation by ligature for the treatment of internal hemorrhoids. One or two of my cases were operated upon at the hospital, while other patients were operated upon at their homes. As a rule, the ligature method of treatment gives good results, and it is results that patients want.

DR. A. H. CORDIER, of Kansas City, Missouri.—While I would express a preference for the use of the ligature in controlling hemorrhage in any part of the body, I must say that Dr. Pennington has presented the subject of treatment of internal hemorrhoids in such a manner as to be almost convincing. His method seems very feasible. It is possible to divide vessels, and by means of compression or torsion control hemorrhage. I would not feel safe without the use of the ligature in operating on these cases, although Dr. Pennington, I believe, told us that he has never had a profuse hemorrhage following this method of enucleation. I feel much safer as far as my own comfort is concerned, and that of the patient's interest, when I put a stout ligature around the vessel.

There is another danger, in addition to hemorrhage, that I wish to call attention to. Occasionally, in operating upon hemorrhoids, we get a death from metastatic abscess in the liver. If a ligature is applied, the vessel or vessels become occluded gradually by a slow process of nature, and hemorrhage is not so likely to take place where a ligature is used. When we leave large open-mouthed vessels in the rectum, there is danger of septic emboli being washed into the liver

through the inferior mesenteric vessel which supplies a portion of the rectum, or there may be free communication with the branches of the internal iliac veins, and these emboli may be carried into the heart and lungs, followed by dangerous results. This is one of the reasons why I should oppose the method of Dr. Pennington.

DR. H. O. WALKER, of Detroit, Michigan.—I have been very much interested in the papers and the discussion. Since Martin and others have advocated the existence of rectal valves, I have bought a variety of instruments, protoscopes, anoscopes, etc., and I have been hunting for these valves. I have put my patients in all sorts of positions, and have not yet found them.

As to the term valvotomy, it is a misnomer. The incision ought to be made all around the whole valve. I understand that by the use of this instrument, which has been exhibited to us, only a section of the valve is taken out, and the danger that has been mentioned would seem to me to be great. Although I am not a rectologist, I have done a little work in that direction.

In reference to the ligature in the treatment of internal hemorrhoids, I object to its use, owing to the excruciating pain following its use, yet we know there is no other treatment that is any more successful than the ligature. We have in some way or other got to close these vessels and occlude them. Some years ago compression or torsion of the vessels was introduced, but it had only been used to a limited extent. In the last year, in a number of cases, I have used Tuffier's angiotribe, which leaves a ribbon about half an inch in width, then cutting off the superabundant hemorrhoids, and my results have been satisfactory. I should be very loath to treat hemorrhoids by excision, particularly a number of them, without constricting the vessels by ligature or the method I have already mentioned.

DR. J. LIVELY JOHNSON, of Louisville, Kentucky.—I wish to refer to Dr. Jelks' manner of treating perirectal abscess. I heartily concur with him in his method of procedure. I always take the precaution to open an abscess, in any region of the body, as soon as I make a diagnosis. I have never used the formalin solution, but I have employed other preparations, such as bichloride of mercury, etc., and I have obtained uniformly good results. I think these abscesses should be opened in all cases in their incipiency.

In reference to the excellent paper by Dr. Pennington, I wish to say that the enucleation of internal hemorrhoids is ideal, but having resorted to it in a few instances I have had some difficulty in controlling the hemorrhage. I believe that the doctor's tampon would be better if he could arrange to inflate a rubber bag and make pressure in that way. I hardly think we could get sufficient pressure to control hemorrhage with the tampon which he now uses. The rubber is smooth, and the blood escapes, and while the rectum is distended hemorrhage could easily occur.

So far as the existence of rectal valves is concerned, I have never had the pleasure of seeing one. I have investigated the matter as best I could for the last few years, both in this country and in Europe, and have consulted the best surgeons in New York, London and Paris, as well as in other medical centers, and none of them could show me these rectal valves. I spent considerable time in St. Mark's Hospital, London, where I had the opportunity of examining as many as fifty or sixty rectal cases a day, that is, both preliminary and secondary examinations, and Mr. Cooper, Mr. Edwards and others, who are eminent in this line of work were unable to show me these rectal valves. Since my return to Louisville I have taken the opportunity of doing some dissections and I have failed to find any rectal valves in the cadaver. I have seen the folds that have been spoken of by Dr. Mathews and others, but I have never seen anything which I could dignify by the name of a valve. It seems to me that if these rectal valves exist in the condition stated by Dr. Pennington and Dr. Taylor, we would not have incontinence of feces. I believe it is claimed by them that the valves are quite sufficient to support the fecal mass. If that be the case, paralysis of the sphincter muscle would not cause incontinence of feces.

In those cases in which we have a number of large hemorrhoids, the best operation, in my opinion, would be the Whitehead. This is the operation which is performed by Mr. Treves, of London, by preference, and I have seen him do it many times with scarcely any hemorrhage. The great drawback in doing Whitehead's operation is the fear of hemorrhage. It is an easy operation to do if one knows how to do it. Mr. Treves does it very easily. In removing hemorrhoids by the method advocated by Dr. Pennington, if they exist around the entire circumference of the rectum, we would undoubtedly have stricture following, because if the entire mucous membrane is removed, it would be quite sufficient in itself to pro-

duce stricture. Where we have a number of hemorrhoids requiring the removal of more than one-third of the mucous membrane of the rectum, I think it would be necessary to perform successive operations. We would have to remove one or two hemorrhoids at a time, then wait a few days, and remove the others, thus rendering stricture very much less liable to occur.

DR. J. RAWSON PENNINGTON, of Chicago.—I want to discuss the papers of Drs. Jelks and Taylor. Dr. Taylor in referring to the histology of the rectal valves stated that Dr. Martin had found them to vary histologically. This is certainly an error as he made no such statement in his discussion before the American Proctological Society, in Washington, D. C., May last, when I submitted a histologic report of these plicæ and demonstrated this fact. Neither did he allude to it in his discussion at the American Medical Association at Atlantic City, June last, nor has he published any such observations. By referring to his writings you will see that after making a histological examination of one valve in the adult he states that they consist of mucosa, fibrous tissue and circular muscular fibers. Then states that the discovery of fibrous tissue is an original contribution to this subject. The fibrous tissue mentioned by him is evidently the same structure called cellular by Houston. In the first place, cellular tissue is the antecedent of the fibrous variety and in the second, the term cellular as used by Houston 70 years ago, would be considered as a loose construction to-day.

In regard to what has been said in this discussion as to the existence or non-existence of these valves by Dr. Mathews and others, I submit herewith a specimen of a rectum containing the valves of Houston and a number of photomicrographs of these plicæ as self-evident testimony in rebuttal of Dr. Mathews' obsolete quotations. In this specimen there is not a man in the most remote corner of this large hall that cannot see them that distance and they are normal. He intimates that if Houston's discoveries are true our anatomies must be re-written. I quite agree with him on this point and if he will carefully search Gray's latest edition and Waldeyer in "Das Becken," 1899, and other late anatomies he will see that they have already begun to rewrite them, and I will venture the assertion that the future authorities upon rectal diseases will do likewise.

By closing this specimen in the manner I show you (indicating) and then looking into the bowel you will observe a small, triangular opening formed by the valves. This same condition and appearance obtains in the living and by directing the patient to bear down you will observe that these valves are brought nearer to each other and that the mucosa is crowded in between their free borders. Now if they are in a diseased condition, stiff and unyielding because of a chronic interstitial inflammation they will maliciously obstruct the descent of the feces through this aperture. Their location, shape, size and histological structure all go to demonstrate that their function is to retard and modify the fecal current.

With reference to dividing these structures for chronic constipation or obstipation, I believe from some experience which I have had in this matter, that there are times when it is indicated and that good results follow the operation. I do not believe, however, in the wholesale cutting of these plicæ for every case of so-called chronic constipation or obstipation. In fact I am opposed to the cutting operation, because I believe it to be a very dangerous procedure, even in such expert hands as those of Dr. Taylor.

DR. H. O. WALKER.—When the urethra is over-distended, bands can be seen all around the canal from the meatus down. Now, if you distend the rectum, you see the same thing.

DR. PENNINGTON.—You see the valves of Houston when you look into a properly inflated rectum.

DR. STERLING B. TAYLOR, of Columbus, Ohio.—I fully agree with everything Dr. Jelks has said with the exception of his after-treatment. In the after-treatment of ischio-rectal abscess, my experience has been that I get better results from plain gauze saturated with a solution of carbolic acid, ten grains to the ounce, packing the abscess cavity, and on the second day withdrawing and repacking the cavity with the same solution. Carbolic acid promotes granulation more rapidly. I was first induced to use carbolized packing from the experience I had in general surgery after the excision of buboes, packing the cavity in such cases with carbolized gauze of that strength.

As to the paper of Dr. Pennington, I enjoyed it very much, but I am afraid of the method he has recommended for the treatment of hemorrhoids. I am likewise afraid of any tampon that will contract when it becomes moist, or one that will become smaller. He admits this himself, and tells us that the

tampon cannot be retained at times, that it slips after forty-eight hours. I believe at that time we are supposed to have no hemorrhage, but within the last week I had a very exciting, although not serious, experience. I operated on a case of hemorrhoids, using the clamp and cautery method. The patient did beautifully until the seventh day, when I was telephoned to come to the hospital at once, that the patient had a hemorrhage. Before I reached the hospital he had another hemorrhage. As Dr. Mathews has told us, we frequently encounter arteries in this region that are as large as the radial, and we may get a profuse hemorrhage within a short time. In this case I introduced the anoscope, turned out clotted blood, and packed with surgeons' wool, saturated with Monsell's powder.

As to the automatic valve-clip of Dr. Pennington, I have no doubt it will do what he says, but I would be afraid to use it, for the reason that we are likely to have a slough in a week or so, or we may have it in ten days, or three weeks, and how much sloughing we are going to have is a question we cannot answer.

DR. WM. BRITT BURNS, of Deckerville, Arkansas.—Referring to the paper of Dr. Jelks regarding the use of formalin, unquestionably it is painful unless mild solutions of it are used. I have used it in abscess cavities, and it caused so much pain even in one per cent. solution that I have abandoned it. There can be no doubt as to its antiseptic properties. I use nitrate of silver, which I regard as the very best pus destroyer, about twenty grains to the ounce. The only objection to it is that if you happen to have light clothes on, you are not only liable to soil your own clothing, but that of the patient, and you are apt to ruin a suit of clothes every now and then.

With reference to the automatic valve-clip exhibited by Dr. Pennington, when I removed it from the piece of paper I could not get it back again, and I do not know how he gets it off. I think it too complicated.

DR. PENNINGTON.—You do not want to take it off, Doctor. The clip comes away by pressure atrophy.

DR. BURNS (resuming).—At the Memphis meeting of the Tri-State Medical Society we had the other side of this question very thoroughly discussed by Dr. Cooke and Dr. Martin, as well as by other valvotomists. I was very much gratified to hear the remarks of Dr. Mathews on this subject, because he is a well known authority and is the pioneer in rectal surgery in this country.

DR. JELKS (closing the discussion on his part).—In reference to the work that I am doing with formalin and the strength of the solution, which was referred to by several gentlemen, who have taken part in the discussion, there is no question but what it is irritating if used in a one per cent. solution. It will invariably cause irritation. If we use it, say, in the strength of a teaspoonful to a gallon of water, extremely diluted, we will get the same effect, so far as its antiseptic property is concerned, and we will not cause irritation, which we would get in using a one per cent. solution. I use it in the strength of a teaspoonful to a gallon, and if I find it is too irritating, I use it weaker, and the guide is its irritating effect upon the raw tissues. I have never had any suppuration after using formalin in the manner I have described. I use it now in all the surgery I do, discarding all other antiseptics.

(Here Dr. Jelks went to the blackboard and described by the aid of diagrams how he dealt with a perirectal abscess surgically.)

DR. PENNINGTON (closing the discussion on his part).—I desire to refer to one or two points that have been brought out by the speakers. The difference of opinion in regard to the treatment of hemorrhoids arises from a difference of opinion as to what constitutes a hemorrhoid. A hemorrhoid is an angioma. It is a diseased condition of the blood vessels and not of the mucous membrane. There are a number of blood vessels running through the hemorrhoid in this manner (indicating); they may be arteries or veins. The object of surgery is to remove diseased and not healthy tissue. When you remove hemorrhoids by either the clamp and cautery or ligature method you necessarily remove much healthy tissue and leave much that is pathologic. I want to tell those of you who use the ligature what you do and why your patients bleed to death. When you put a ligature around a hemorrhoid, what occurs? At this point (indicating) let us suppose that there is a large vessel. In the first place, you make an incision in the manner I show you; the blood vessel runs up from the point there; you cut close to it and almost entirely sever it. You throw one ligature around the vessels at this point, and another around there (illustrating); you tie them, and in doing so almost sever the blood vessels. You dress your patient, put him to bed. The ligature cuts through the vessel, holds it wide open and your patient's life-blood flows freely from

him until it is too late, all is over. Should he recover from the operation it is only a question of time when he returns to you with another case of piles. In your operation you did not remove all of the angiomatous tissue, on the contrary you removed much tissue that was healthy, and left behind much that was diseased. In other words, you leave a condition which favors the development of hemorrhoids in the future. Every man must admit that hemorrhoids do recur after operation, and this is one of the causes why they recur when you use the ligature or clamp and cautery. I stated in my paper that if I could not control hemorrhage by means of torsion when excising hemorrhoids, I would put a ligature around the vessel, but I have never found it necessary to do that. It is easy to arrest hemorrhage by torsion. By resorting to the operation of enucleation of hemorrhoids, we remove every particle of the angiomatous tissue.

With reference to the use of the clamp and cautery, Gerster, in speaking of it some time ago, said we can only remove about one-third of the uppermost part of the hemorrhoidal node with the clamp. As a hemorrhoid is a diseased condition of the blood vessels and not of the mucous membrane covering them, it is necessary to do a radical operation to remove all of the angiomatous tissue, and this can only be done by thorough enucleation. I have had no difficulty in controlling hemorrhage by torsion. The operation by enucleation is different from that by excision of Allingham.

DR. TAYLOR (closing the discussion).—We have been told by Dr. Mathews that obstipation is not the result of these so-called rectal valves, but of stricture. Making a longitudinal section of the gut, we will place opposite the second segment of the sacrum a valve; a little higher up on the right side we will place another valve, as high as I believe them to be. We have a dilated condition above; this portion of the bowel is filled with fecal matter, resting on the hypertrophied valve. More and more fecal matter accumulates, and as it does so more pressure comes from above. The second valve will be forced down upon the first, and we will have obstruction there frequently. In examining patients I find that we can scarcely see the free border of the second valve beyond the free border of the first. Occasionally we find the free border of the second valve completely out of sight. It cannot be seen by changing the protoscope on either side. In such cases we have a mass of

fecal matter coming from above, pressing down, causing more pressure from above all the time. The second valve is brought against the first, and then we must of necessity have obstruction. You may call it constipation or obstipation.

As to the relief of this condition, we will suppose we have here (indicating) a rectal valve. We incise the free border of the first with the bistoury, later taking a scalpel and cutting down almost to the level of the gut. We have a gaping wound. The angle of this wound is attached with the needle to the distal mucous membrane, and then the proximal mucous membrane. You thread the needle with catgut, insert it, pull down, after having buttoned the suture through. You slip the shot over, carry it to the angle of the wound, and then clamp. You have thus obviated any chance of hemorrhage at that point. Prior to doing this, or to inserting the needle, if you have a bleeding artery, it is easy to catch it up and control hemorrhage either by pressure or ligature. Having inserted the stitch at this point (indicating), we put in another and seal up the cut edges completely.

XXI.—REVELATIONS OF THE PROCTOSCOPE IN HEALTH AND DISEASE.

BY A. B. COOKE, M. D.

NASHVILLE, TENN.

It is but a truism to say that clear and definite knowledge of the anatomy of an organ is the fundamental requisite to intelligent comprehension of its pathology. This applies of course with especial force to those organs or parts the diseases of which are mainly surgical.

Unquestionably, the greatest obstacle the rectal surgeon ever had to face was lack of adequate facilities for examination of the organ. The immense number of "new" and "improved" speculums, sounds, retractors, etc., from time to time perpetuated upon a helpless profession, are convincing witnesses of this fact. And the barbarous practice of introducing the entire hand into the rectum for the purpose of exploration, countenanced by certain authorities even to-day, bears still more eloquent testimony to the desperation of the workers in this field.

All varieties of speculums and bougies are open to one simple criticism, namely, that they fail of their object. The best of the former, if such an expression is permissible with reference to contrivances uniformly bad, effect only partial exposure of the distal three inches and that at the expense of great discomfort to the patient unless general anesthesia be employed. With respect to bougies—the shape and contour of the rectum are such that they are of doubtful value even in the hands of the most skilled and their use is attended by an element of danger too positive to be ignored.

The relations and attachments of the rectum are such that thorough knowledge of its anatomy can only be acquired by studying the organ in situ in the living subject. I would not be understood as disparaging the value of dissections. Of course much of the anatomy can only be learned through dead-room work. But the rectum has certain peculiar and distinctive characteristics which are so modified by post mortem changes as to render their demonstration by the ordinary methods impossible.

The great underlying principle of proctoscopy is atmospheric inflation of the viscus. Employed under ordinary conditions the proctoscope is a disappointment and practically a failure in that the collapsed state of the organ permits a view of only an area corresponding to the diameter of the instrument used. In order to the successful practice of proctoscopy there are just two essentials, namely, (1) proper posture of the patient, and (2) the employment of reflected light. With regard to posture: nothing short of the knee-chest position or some modification of it will answer, and even this will fail unless the additional precaution be taken to remove all constriction from about the patient's waist. When such position is assumed the movable viscera fall forward and downward out of the pelvis, the sigmoid flexure is straightened out as much as its attachments will allow and a partial vacuum is formed in the rectum into which upon opening the anus air rushes, distending the organ when in a healthy condition to its full normal extent. Just here the chief objections to those elaborate modifications of

the proctoscope designed to accomplish forcible inflation of the rectum, may be mentioned. In the first place, when the organ is in an approximately healthy condition they are wholly unnecessary. In the second place, when so diseased that inflation fails to take place spontaneously the application of sufficient force to effect this result would be hazardous.

Concerning the light it need only be further said that either the natural or the artificial form will serve the purpose. The one essential in this connection is that a good concave mirror be used to concentrate it upon the field to be explored.

These details of technic are referred to thus explicitly for the reason that I have more than once been approached by physicians who had attempted this method of examination with the complaint that it was a failure in their hands. Inquiry always developed the fact that the failure lay in them instead of the method.

Whether in health or disease due care and gentleness are to be employed in the instrumentation, both in order to avoid inflicting pain and to the end that the comfort of the patient may promote that condition of passive relaxation so necessary to satisfactory results. Properly performed proctoscopy of the normal rectum is entirely painless; in disease it is more nearly so than any other method of examination. As having an important bearing upon this point it may here be noted that the introduction of the instrument is greatly facilitated by bearing in mind the normal direction of the bowel. Through the distal two inches—the fixed rectum—it should be made to pass as though the umbilicus were the objective point, then turned abruptly backward, or rather upward in the proctoscopic posture. into the hollow of the sacrum, the concavity of which is closely followed for the succeeding four inches.

In proctoscopy of the normal rectum the two inch instrument—anoscope—should first be employed. The distance to which it can be introduced varies somewhat with the conformation of the external parts. As a rule it just reaches a point corresponding to the circumrectal attachment of the levator ani muscles. The chief value of this instrument is for explora-

tion of the anal canal and the most noteworthy revelation it makes has reference to the muscles just mentioned. Upon withdrawing the instrument slightly the proximal extremity of the anal canal is seen to contract uniformly until its diameter is diminished by more than half, a furrow or sulcus forming between the ring of contraction and the internal sphincter. In some cases the closure is more nearly complete and the appearance very much resembles that of a sphincter muscle in action. The phenomenon is produced by the simultaneous contraction of the two levator ani muscles, which neither as regards structure nor action can be properly considered distinct and independent. At a recent medical gathering I had occasion to report a case of pelvic abscess which had ruptured into the bowel above the insertion of the levator ani. My astonishment was great when a distinguished gynecologist present asked if he had understood me to say that the levator was attached to the bowel at any point and upon my replying most emphatically in the affirmative stated that such was certainly not the teaching of gynecology! To those accustomed to the use of the proctoscope my critic's statement will prove interesting not to say amazing.

Proctoscopy of the movable rectum at once demonstrates the rectal valves to be anatomic facts and the most conspicuous features of this gut. Considerable variation as to the number, location, etc., of these structures is encountered in different subjects. But I wish most emphatically to state that they are never absent and never so poorly developed as to warrant the least uncertainty as to their existence. With respect to any given individual they are absolutely constant and invariable. The mucous folds which have been confused with the valves by certain writers are entirely different structures due to the great redundancy and mobility of the rectal mucosa, met with only in collapsed states of the organ, wholly obliterated by distention and consequently not to be seen in proctoscopy, and purely adventitious as to size, shape, location and number.

When the proctoscope is introduced beyond the level of the levator ani muscles and maintained steadily in the long axis of

the bowel, the valves are seen standing out from alternate sides and apparently narrowing the bowel lumen to the irregular elliptical shaped opening between their free margins. Occasionally no such opening is visible and the further course of the gut only becomes visible when the first valve is gently displaced by the instrument. It is a simple feat by means of the probe hook to verify the reality of these structures and determine their distance apart, individual depth, etc., etc. The classic description of these structures written by Mr. Houston seventy years ago, in spite of many vigorous assaults, remains true today in every essential particular. Three is the average number of the valves and they are so disposed as to divide the rectum into separate compartments and form a spiral tract down its interior. These several compartments are readily recognized under proctoscopy. Martin's suggestion that they be designated rectal chambers and numbered from below upward is a valuable one in that it renders possible that definiteness of expression so greatly to be desired in speaking of this organ and its diseases. Thus, for instance, when it is said that a lesion is located on the anterior wall of the second rectal chamber the idea conveyed is exact and definite.

Passing the proctoscope into the highest rectal chamber the physiologic narrowing at the juncture of the rectum and sigmoid will at once be observed. This is always well marked and guarded by a valve which serves still further to constrict the lumen at this point. At this site another noteworthy revelation is made. It has long been the teaching that the junction of rectum and sigmoid flexure takes place opposite the sacro-iliac articulation on the left side and that the rectum below this point presents a lateral curvature with its convexity looking toward the right. Eighteen months' experience with the proctoscope have led me to conclude that this is by no means the universal arrangement. It has been my observation that in fully one half the cases the rectum begins to the right of the median line and the lateral curvature if any, has its convexity directed to the subject's left. In certain rather rare cases, instead of a curvature, the rectum presents a well-marked angulation. When this

condition obtains it is usually to be observed at the site of the second or third rectal valve and constitutes a point to be carefully reckoned with both in the introduction of the proctoscope and in the question of diagnosis.

For the exploration and study of the rectum proper the six inch proctoscope is the longest required. Intelligently manipulated this instrument may in the majority of cases be introduced well into the sigmoid flexure. When it is desired to carry the examination to the higher parts of the gut instruments of greater length must be employed, i. e., the sigmoidoscope and colonoscope. In certain cases these will serve an indispensable purpose, though prudence would dictate that they, particularly the latter, be resorted to only in case of necessity.

The above is but an outline of the more striking revelations of the proctoscope in health. That they are important to all who would thoroughly understand the anatomy of the organ is self-evident. And it is also an obvious fact, though disregarded in some quarters, that no man who has not practiced this method of examination is in position to discuss either the truth or the import of the revelations alluded to.

The possibilities of proctoscopy in the diagnosis and treatment of diseased conditions of the lower bowel are practically limitless. That this method is capable of revealing every detail of every portion of the rectum to direct inspection is a fact of almost revolutionary significance to the workers in this field. As a direct result several mooted points in rectal pathology have been settled beyond the possibility of further controversy, and the term "obscure," as applied to diagnosis, banished from the vocabulary of the well equipped proctologist. I am prepared to make the broad statement that failure to locate with precision and correctly diagnose any rectal lesion, with rare exceptions, means either inexcusable incompetence or a most reprehensible carelessness.

But the possibilities of the proctoscope are by no means limited to rectal diseases proper. The true situation and character of other (extra-rectal) pelvic diseases are occasionally revealed by this method after all others have failed. As might

be supposed, such instances are met with chiefly in obstructive conditions of the lower bowel due to evtra-rectal causes, such as adhesions, the pressure of neoplasms, inflammatory masses, etc.

It would involve a fruitless consumption of time to undertake specific mention of the various separate lesions to which the proctoscope forms an open sesame. Both as regards diagnosis and treatment the list is co-extensive with the pathology of the rectal ampulla. For present purposes I shall content myself with the citation of a few cases by way of illustration:

Case I.—On September 29, 1899, I was called in consultation with Dr. T. L. Maddin to see Miss T., aged 36. Both the family and personal history clear. The trouble from which she was suffering dated back about one year, at which time she first noticed some blood and mucus in her dejections. These gradually increased in amount and her health began to fail. She sought medical advice and was treated, or rather mistreated, for "bleeding piles," "rectal catarrh," and "chronic dysentery," and finally sent to the Springs. Returning home after several weeks she was weaker than when she left, being anemic from loss of blood and her bowels moving from six to twelve times a day. Proctoscopy revealed no trace of hemorrhoids, bleeding or otherwise, and no lesion of any kind in the rectum proper. Not until the examination was carried eight inches up was the source of the trouble located. At the junction of the rectum and sigmoid and extending several inches into the latter there was an outgrowth entirely encircling the gut which had much the appearance of malignancy, but proved on microscopic examination to be papillomatous in character. The curette was first resorted to and followed by direct local applications through the proctoscope with the result of saving the patient's life. Correct diagnosis and effective treatment would have beeen impossible in this case by any other means within my knowledge.

Case II.—Mr. G., aged 45, referred by Dr. W. G. Ewing Jan. 13, 1900. Patient gave the following history: was submitted to operation for internal hemorrhoids in the summer of 1898. His convalescence was attended by great pain in the region of the rectum and the formation of a large pelvic abscess which finally discharged through the bowel. He was under treatment for the abscess during the next six months, at the end of which time he was pronounced cured. The succeeding year was marked by a persistent muco-purulent discharge

from the anus and a more or less constant sensation of uneasiness in the parts. For several days before I saw him he had been suffering with increasing pain in the old locality, which was greatly aggravated by defecation. Digital examination revealed a large fluctuating mass presenting upon the left side about three inches above the anal opening. He was sent to bed and prepared for operation the following day. During the night the abscess ruptured into the bowel with the disappearance of all symptoms. Two days later the patient was submitted to a careful and prolonged proctoscopic examination and the point of rupture finally located in the left posterior wall of the first rectal chamber about one half inch above the attachment of the levator ani muscle. The treatment always through the proctoscope, consisted of incision, curettage, stimulating applications, gauze packings, etc., and after three months perseverance resulted in closure of the cavity and tract and complete cure of the patient.

Case III.—Mrs. F., aged 48, came to me from Alabama Feb. 9, 1900. Personal and family history excellent. The patient had been a sufferer for several years with chronic diarrhea, which she thought was a sequel of an attack of acute dysentery. She had undergone treatment at the hands of several different physicians, no two of whom agreed as to the diagnosis and no one of whom had ever made a physical examination of the rectum. At the time she consulted me she was having from four to eight or ten discharges from the bowel a day the majority of whi hcconsisted of blood stained mucus and pus in variable amounts.

Proctoscopy revealed a general hypertrophic proctitis with many points of superficial ulceration, simple in character, involving the mucous coat of the ampulla and extending almost as high as the recto-sigmoid junction. The trouble rapidly yielded to the use of the nitrate of silver spray and the application of a stronger solution directly to the ulcerated points.

This case is reported as one of simple ulceration of the rectal pouch. A certain eminent authority contends that such pathology is of extremely rare occurrence in that situation. My own observation justifies a very different conclusion. At least a dozen cases similar to the one reported have come under my care within the past few months and in the light of my personal experience I am disposed to regard the question as one which the proctoscope has definitely and finally settled.

In conclusion, I would enter an earnest plea for the more general adoption of the proctoscope. What the laryngoscope, ophthalmoscope, stethoscope, etc., have proved to be to the workers in other fields, the proctoscope is to those who have to do with the rectum and its diseases. It has substituted certainty for conjecture in diagnosis and scientific accuracy for guess-work in treatment. In short, it has established beyond contention the claim of this department to the rank and dignity of a separate specialty. And those of us who regard our calling from the nobler point of view cannot afford to follow longer in the old haphazard path merely because it was blazed out by our forefathers and has been trodden by many illustrious feet.

XXII. — TREATMENT OF TUBERCULOSIS OF THE SPINE.

BY ALEX. C. WIENER, M. D.

CHICAGO, ILL.

At the outset of these remarks it seems to be appropriate to state that they do not pretend to be exhaustive on so vast a subject, but rather to give a short sketch of personal experience. Some criticism on the general surgeon who rules our hospitals of today, is unavoidable. Surgery has for its purpose the treatment of conditions which result in mechanical changes of the structures, to this end employing mechanical means. The use of the knife and the forceps, really is based on the same principles as an extension apparatus; the one relieving the pathologic tension of the tissues by laceration of the integument, the other without. Now that the great temple of aseptic surgery is erected and finished and gathers in its walls all the scientific physicians and surgeons the world over, the attention of surgeons may well return to those unfortunates in whom the morbid processes of the osseous system are not assailable with the knife, yet will terminate in serious deformity unless relieved by other mechanical measures.

Now then, what is the general surgeon doing for the relief

of an unfortunate affected with a tubercular spondylitis? Send him to the medical side for internal treatment, from whence the sufferer is promptly returned? "Interne, you make that chap a nice plaster of Paris jacket and send him home." And the interne obediently goes to work and wraps the crippled aching trunk into a series of plaster of Paris bandages, calls it a jacket, which if there be funds, is ornamented with some leather trimmings and hooks to fasten the laces on. Or an instrument-maker is called in to relieve the patient with steel bars and leather and to beautify him with a jury-mast. Walk through the wards of the different hospitals: There linger those afflicted with Pott's, year in and year out. What is done for their relief and cure? What care is taken of the unfortunate children to make them useful members of society?

The indications in the treatment of tubercular spondylitis are clear and simple enough: Early diagnosis before deformity becomes manifest, since the best remedy for deformity is to prevent it. Reflex spasms of the long muscles of the spine overshadow all other symptoms in importance; indicating early local irritation, it is the most valuable guide for the diagnostician. For the same reason, it is the source of all the pain, local and referred, that the patient has to endure. Above all, it anatomically crowds the diseased parts into each other, thus favoring the process of decalcification which is prone to set in in all bones infected with the tubercle bacillus. In its efforts to bring about an apposition of the healthy edges of the vertebræ, it pushes the arches and dorsal processes backward, and the result is that the patient is deformed—a hunchback, a cripple.

We should by all means, counteract these reflex muscular spasms in the most effectual and thorough manner. Do not stubbornly adhere to the conventional immobilization with a plaster of Paris jacket. You can, however, always depend upon permanent weight extension, no matter whether you combine it with total immobilization of the spine or not. Although immobilization is most vigorously advocated by text-books and is so much facilitated by Phelps' ingenious device, the portable plaster of Paris bed, it seems to take a second place in relieving

the pain and paralysis when existing. Weight extension from one pound, gradually increased up to ten pounds, applied to the head with the bed inclined at forty-five degrees, so that the body may act as counter-extension, has lately relieved a boy of four years, affected with a gibbus at the seventh dorsal vertebra, and with a total paralysis of the lower extremities. He is now able, after nine weeks' treatment, to walk through the room without a support. Plaster of Paris jackets carefully applied before the class at my clinic had previously reduced the boy's general condition to an alarming degree.

It would be against the hygienic principles now generally accepted for all tubercular patients, and which we see carried out in this beautiful spot in such a classical and successful manner, to keep the patients imprisoned in bed for a long time. Luckily, the reflex spasm very soon yields to weight extension, the patient then being able to be out doors protected by an extension apparatus and carrying the weight at night. Light weight favors sleep. Fresh air, plenty of food and cheerful surroundings, are, as a matter of course, demanded for our tubercular patients. But do we strive to furnish them? Does there exist a single public hospital in any of our large cities which is fit to take care of one tubercular case? Rarely do the children leave the cheerful surroundings of their ward, and as to the stuffing process, I entertain grave doubts whether the children permit themselves to be stuffed with the food they are getting on their plates. Yonder, in the town of Elgin, near Chicago, on a hill on the banks of the beautiful Fox river, stands the Northern Hospital for the Insane, offering the hopeless cases of insanity all the advantages required for our little tubercular patients. The latter have life before them; many are very bright children with impressive and thankful minds, and they ask in vain from the community for effectual treatment of their shattered bodies and for an education which will permit them to develop their rich intellectual gifts to be used in the interest of the community and their own.

We will now devote our consideration to the two most dreaded complications of tubercular spondylitis—paralysis and

gravitation abscess. When not relieved properly and in time, the local tubercular ostitis continues to spread. The cord is then enveloped in a dura mater thickened by the products of tubercular inflammation. Disturbances of circulation follow, mainly consisting of an endarteritis and a lymphatic stasis which produce an edema of the cord at the seat of the disease. Sensory paralysis, motor paraplegia, paralysis of the bladder and rectum are now attributed to the infection of the dura matter. A close study of the morbid conditions clearly shows why laminectomy only affords a passing relief to the sufferer, for it is not the pressure of the sunken vertebræ which affects the function of the medulla. Liberated from compressing granulations, the function of the cord returns. A year or so after, paralysis is manifest again, and the general conditions have grown so much worse as the avenues are now open for that grave and most to be dreaded complication, mixed infection.

There is, however, a single exception outside of mixed infection, when laminectomy is indicated in tubercular spondylitis; namely, in those rare cases, when a gibbus suddenly developed, is immediately followed by paralytic symptoms. The fact, that in such cases the cord is compressed by a large sequester which irreparably endangers its structure, justifies immediate and heroic measures.

Presuming the acquaintance of this splendid assemblage with the forcible correction of the spine in tubercular deformities, advocated by Calot, I wish here to give Calot credit for his daring work. The permanent benefit of Calot's work consists in a more active therapy in tubercular spondylitis. Slight daily extension combined with careful manual pressure is of great advantage, not in directly correcting the deformity, but in improving the arterial and lymphatic circulation and thus imparting to the infected region a mild formative irritation. This ought to be done without causing the child much anxiety, for the greatest importance is to be attached to a cheerful and hopeful state of mind. The manual treatment is to be perpetuated by correction with judiciously applied elastic bands. Smaller gibbosites in the middle of the dorsal region I have thus

succeeded in correcting in two young ladies one of eighteen years, the other of twenty-five, the latter having lost the use of her limbs before the apparatus was finished.

As to the permanent results of forcible correction of the spine, I am skeptical, in the face of all the great results and convincing pictures published in the international medical literature, for reasons presently to be given. Shortly after the International Congress at Moscow, Calot presented his method. It was my good fortune, through the kindness of Dr. Josephine Jackson, the interne at the Cook County Hospital, to watch a case of tuberculosis of the spine that offered an opportunity to study the mechanical changes of the spine, by applying the new method. The following report of this case was written by Dr. Josephine Jackson:

John Smith, aged four years, was admitted to the Cook County Hospital in the spring of 1896, his complaint being that he had "lost his walk while falling off his bicycle." No definite history was obtained as the child was an orphan and had no friends.

Examination showed a fair degree of general nourishment and a pale, clear skin. The face was of more than average intelligence. The shoulders were raised, and the head lay between them with the chin elevated. When sitting, the lower extremities were doubled under the body, and the trunk was supported by resting on the palm of one or both hands. There was a marked prominence in the mid-dorsal region with a compensatory lordosis. There was also a right lateral curvature, but of slight degree. The thoracic walls spread outward at the lower portion, and the abdomen was protuberant. When in a recumbent position there was spastic rigidity of the lower extremities with complete extension, and adduction so exaggerated that one little foot crossed over and lay in front of the other. Passive motion, attempting flexion or abduction, was met with great resistance, and yielded each time with the characteristic jerk. This motion did not cause pain. The muscles showed the atrophy of disease. Both superficial and deep reflexes were exaggerated, and ankle clonus was easily elicited.

Examination of the trunk by palpation, percussion and auscultation revealed no pathological condition of thoracic or abdominal viscera. The child ate and slept well, and was free from pain. There was persistent incontinence of urine and

feces, which were partly overcome by prolonged, careful training, but the vesical reflex was always imperative, yielding only temporarily to cerebral inhibition.

In June, 1897, systematic treatment was begun, consisting of salt baths, massage, and passive motion of the lower extremities. July 11, an apparatus, designed and constructed by Dr. Alex. C. Wiener, was applied, supporting the weight of the head and shoulders, so that the child soon became able to sit erect without pain while leaving both arms free. So much comfort was gained from the support that the child was unwilling to leave it off after the first day. The spastic condition of the lower extremities lessened, more especially in the right leg, and the child soon learned to slip out of bed and support his weight on his feet. A little later he succeeded in taking a step with the right foot, but the rigidity of the left could not be controlled.

During the latter part of August urination became very painful, and urine of acid reaction was found to contain abundance of pus. The temperature rose to 102-3 F., pulse 120, respirations 36; appetite was lost; a state of semi-stupor came on, and the child died Sept. 17, without having suffered much pain, and without any change in the physical findings.

Autopsy revealed a caseous mass replacing the body of the sixth dorsal vertebra. This mass was covered in by fibrous tissue which was easily ruptured. A few sequestra were imbedded in the mass. Removing the caseous material the dura mater was exposed, but presented no gross changes. There were no evidences of pressure on the cord. Extending from this diseased vertebra, outward and downward to the diaphragm, and lying on the posterior wall of the pleural cavity, was a similar caseous mass, not involving the ribs. The portion of lung lying directly over this tubercular focus showed pneumonic inflammation at the stage of red hepatization. There were no tubercles in the lung. An adhesive pleuritis, recent, and with easily separable adhesions, obliterated the left pleural cavity. The left kidney showed several tubercles in the cortex, and a caseous focus at the lower pole, while pus in abundance was expressed from some of the calices. The pelvis was not distended. There were no tubercles in other organs, and the mesenteric glands showed only a moderate degree of enlargement.

On inspection of the specimen, what structures do we find left to produce new osseous tissue, sufficiently substantial to fill in the wide gap created by the destruction of the sixth vertebra?

With the periosteum mostly gone and the vertebral epiphyses destroyed, we cannot conceive of the formation of those bridges of bone which, as Calot asserts, connect the severed vertebræ in such a way as to assume the function of the lost vertebra.

In the year after Calot's method was made known, the literature on that subject was very prolific. Now that the time has arrived when final results ought to be obtained in the cases operated on two years ago, a cautious reserve is manifested all along the line.

There are, however, two indications which call for forcible correction; namely, deformities of recent date and those complicated with stubborn paresis. The operation of the former is easy and attended with little danger, while in the latter case, the risk to life is out of all proportion to the possible good obtainable by heroic measures. Péan describes the case of a girl fifteen years old afflicted with an enormous kyphosis of the upper part of the spine, complicated with paralysis of the lower extremities. As she had been kept on a stretch for two years without benefit, Pean used forcible correction and an immobilizing plaster of Paris corset; whereupon the paralysis immediately began to subside.

Another complication, prominent by virtue of its frequency and the difficulty of treatment, is the gravitation abscess. In spite of the repeated and urgent warnings of orthopedic surgeons, the temptation to thrust the knife into the most prominent part of the abscess and to empty the pus, seems irresistible to the average surgeon. The source of the pus being far away, what else is accomplished than to afflict the patient with a permanently oozing fistula? Mixed infection and amyloid degeneration of the inner organs, will soon do away with the invalid. Abscesses of such origin cause very little fever, 101 degrees F. being the highest recorded. They do not produce septic symptoms, and they are, under favorable circumstances, brought to absorption. I have seen a tuberculous abscess in the right iliac fossa, the size of a child's head, disappear in a man forty-five years of age, without leaving a trace behind. He had a tubercular destruction of the first lumbar vertebra and all he was treated with was a permanent extension apparatus.

Lately, I have used a large trocar to empty the pus in a large psoas abscess reaching down to the middle line of the left femur, and which originated at a tuberculous spondylitis of the first and second lumbar vertebræ. The man, 34 years of age, was attacked the first time with tuberculous spondylitis seventeen years ago, this leaving quite a kyphosis of the lumbar spine. For seventeen years he did not experience any inconvenience, when, without apparent cause, the tuberculous process revived, resulting in a large psoas abscess, which bulged at Scarpa's triangle forward and just behind and below the left great trochanter was found a small swelling about the size of a silver dollar. This spot was chosen for three preliminary injections of carbolic acid, six drops each time, five or seven days apart. Carbolic acid seems to be possessed of powerful chemotactic qualities, since it allured, so to speak, the pus to the outer side of the femur. One pint of thick pus was emptied the first time, intermixed with chunks of fibrinous coagula and fine osseous debris. Then fifteen drops of 95 per cent. carbolic acid were slowly emptied into the abscess cavity. The operation was repeated six times at intervals of two or three weeks. The last injection was made three months after the first one, when the fluid had changed into a clear yellow serum. At no time was there any harm experienced, either local or systemic, from this strong poison. The injections seemed to absolutely cause no pain or inconvenience.

In conclusion, permit me to urge upon each member of this distinguished association that he direct his efforts to the end that proper care may be taken of the unfortunates afflicted with surgical tuberculosis in hospitals suited for the purpose; the individual and the commonwealth will be the beneficiaries.

DISCUSSION.

Dr. J. Holinger, of Chicago.—I wish to say a few words in connection with the paper of Dr. Wiener. I have had an opportunity to see his work in different places, and particularly in the West Side Hospital, of Chicago, as well as at his office. I recall having seen two of his patients, a lady of twenty-five

being one of them. One could hardly understand that this lady should have been paraplegic, because when I saw her I could not see the slightest thing while she was wearing the complete apparatus that the Doctor has described. This woman had a deformity which had existed for quite a while, but now it is absent. The only trace of the disease that could be observed was when passing the finger along the vertebral column she would give a sudden jerk when a certain vertebra or vertebræ were touched. While I do not see very much of this orthopedic work I was very deeply impressed with the remarkable result in this case. The other patient, a little boy he spoke about, I saw in the West Side Hospital. The patient is gradually improving.

DR. WIENER (closing the discussion).—I wish to relate one case of gravitation abscess. Dr. Phelps, who is to read a paper on that subject, will speak of it more extensively. I simply want to say, that you need not despair of a gravitation psoas abscess where the pus starts from some distant point, even in the cervical region. My patient was a man thirty-five years of age, in whom the gravitation abscess had extended half-way down the femur. No incision was made in this case, as it is considered bad practice, but by means of the trocar the pus was removed, and fifteen drops of a ninety-five per cent. solution of carbolic acid were injected into the abscess cavity. This procedure was repeated six times. The man is now enjoying good health, although he is not cured. He still has tuberculosis. He works all day and moves about without difficulty. The abscess has been entirely obliterated, although at may at any time return. Dr. Moyer, our President, saw this patient and he can confirm what I have said.

DR. MOYER.—The case to which Dr. Wiener referred was a most instructive one to me. The man, as he has told you, had a gravitation abscess of the thigh, and the cure, if we may term it such, is certainly a remarkable one.

XXIII.—THE TREATMENT OF TUBERCULAR AND PURULENT HIP-JOINT DISEASE WITH LARGE GLASS SPECULUM DRAINAGE AND PURE CARBOLIC ACID—WITH A REPORT OF 70 CASES.

BY ABEL MIX PHELPS, M. D.

NEW YORK, N. Y.

Last year I had the honor of presenting to this Association a method of treating abscesses and diseases of the joints which is somewhat unique. I also presented at that meeting a report of several cases of erysipelas treated in the City Hospital with pure carbolic acid, and the charts of those cases showed that the plan of treatment aborted every case.

Since the reading of that paper, I have operated on all suppurating and tubercular joints with abscesses by the plan presented at that meeting. All of our erysipelas cases at the City Hospital have been treated with applications of pure carbolic acid, and during the past year, of the scores of cases so treated in the erysipelas pavilion and surgical wards, all have been either aborted or immediately arrested, and I believe no deaths are recorded.

In regard to the use of pure carbolic acid in tubercular and suppurating joints, and the method of its application, I am thoroughly committed to, and I urge upon the profession the importance of following the method, because I am convinced that it is superior to any other that I have resorted to, or of which I know. There is a wide difference of opinion in the orthopedic profession as to the advisability of operating upon these joint abscesses. We have one extreme wing who advocate the do-nothing plan, and in one of Ridlon's papers he states that not one case in a hundred should be interfered with. Then we have another wing of the profession who believe that

abscesses which are causing constitutional or any considerable local disturbance should be operated upon. Lastly, another portion, to which I belong, believe that every suppurating or tubercular process of joints attended with abscess should be operated upon so soon as a diagnosis is made, and for the following reasons:

Abscess in no way interprets the pathological condition present in a joint. The largest abscesses, those which cause the greatest constitutional disturbance are attended frequently with a small amount of or no bone disease, whereas the more severe forms of bone diseases of joints are frequently attended with small abscesses which cause no constitutional disturbances, but which insidiously destroy the entire joint, resulting later on if early interference is not insisted on in a complete excision or the death of the patient.

Knowing these facts, as I have observed them in hundreds of cases clinically, I urge an early operation on all abscesses, either tubercular or purulent, as soon as a diagnosis is made. The operation is performed for two purposes:

First, and the most important, for the purpose of exploring the joint to ascertain the parts involved, and the amount of destructive changes which have taken place.

Second, for the purpose of thorough drainage. An empty house is better than a bad tenant, and surely, if living tissue lies in contact with tubercular or purulent material infection necessarily takes place with destruction of bone or soft parts in proportion to the duration of maceration and extent of infection.

And then again; abscesses, particularly of the hip joint, in a very large proportion of cases, ulcerate through the capsule anteriorly, rupturing into the iliacus internus muscle, a portion of which rises from the anterior border of the capsule, thereby finding its way, by burrowing upwards over the brim of the pelvis, into the iliac fossa. Such cases nearly always result in extensive destruction of the inside of the ilium, because drainage from this fossa is interfered with on account of the pressure of the tissues lying across the brim of the pelvis.

After years or months have elapsed, on account of the condition of the patient an operation is deemed advisable, and the surgeon will frequently find that he has to detach from the crest of the ilium the abdominal parietes, and with a scoop and chisel remove the entire iliac fossa. This accident could be easily avoided by an early exploratory operation as early as fluctuation is detected about the joint.

And then again, if the abscess does not find its way into the iliac fossa, Scarpa's triangle becomes filled with pus, burrowing takes place frequently through the triangle, making its appearance on the posterior aspect of the leg, or underneath the fascia downwards upon the anterior aspect of the thigh, destroying whole groups of muscles.

There is no reason that I can find for allowing any abscesses to produce these secondary destructive changes. Very frequently—and I have a list of several cases—perforation of the acetabulum takes place. Pus finds its way down along the inside of the pelvis between the bone and the pelvic fascia by the side of the rectum, rupturing into it, and often destroying the sphincter muscles, or establishing a communication between the joint and the rectum, from which fecal matter and gas constantly escape.

Such cases I have operated upon, and they are most serious and difficult to remedy. An early operation would have prevented this calamity. Pus never finds its way into the iliac fossa or the retro-peritoneal cavity through the acetabulum, so that it can be felt by palpation from above. This has been taught, but it is a mistaken idea, and the gentleman who first wrote it, and those who copied it afterwards in their writings, had had no clinical observation upon the subject, or the error would never have crept into our literature. The only way that pus ever finds its way into the iliac fossa is by the route which I have already described, on account of the rupture of the capsules anteriorly.

Now, let us go back a little and examine briefly the etiology and pathology of the conditions which lead to abscess. My remarks will be confined to hip joint disease alone. Hip joint

disease, either tubercular or purulent, is always preceded by a lesion, either of the bone or soft part. There must necessarily be, according to the laws of bacteriology, a soil fit for the reception and growth of bacteria. This soil is inflammatory new material. When a lesion has occurred, from injury or from embolism, there is at once an effort of nature made to repair. If inoculation into this area of normal inflammatory material does not take place, such a child will have all the symptoms of hip joint disease, and will recover within a month or two unless subsequent injuries are inflicted.

These are the cases of so-called ephemeral hip joint disease. They are simply cases of normal inflammatory action for the purpose of repair. This normal inflammatory action is attended by the following conditions:

When a lesion has been produced, hemorrhage takes place; then the wandering of cells, or rapid cell proliferation at the point of lesion. The bloody clot becomes organized by displacement. Cells arrange themselves into line to repair the tissues injured. Loops of capillaries and small nerve filaments are thrown out into this new inflammatory material for the purposes of nutrition. After a little, each cell becomes converted into tissue resembling the tissue which has been injured —bone cells producing bone, other cells producing soft parts. After organization has taken place contraction of the new inflammatory material occurs. The loops of the capillaries and nerve filaments are destroyed by pressure and a scar is left.

If the pathogenic bacteria are floating in the circulation of the child, and they come in contact with this new inflammatory material during the normal process of repair, inoculation is likely to take place, and cell after cell in this new inflammatory material becomes destroyed, and bacteria deposit or secrete their toxins, and the entire area of inflammatory repair is converted into a pus or tubercular cavity. This pus cavity, filled as it is with bacteria, is a reservoir from which infection of surrounding tissues takes place. If the diseased cavity is in the head of the bone or neck, it enlarges until perforation occurs, and the joint itself becomes secondarily infected. If

the infection is in the epiphyseal lines of the acetabulum then the joint becomes secondarily infected at the same time as the primary infection in the acetabulum. The head of the bone and acetabulum may become secondarily infected from the abscess within the capsule of the joint, when soft parts are primarily involved. In other words, the maceration of these bony structures in this infectious material loaded with bacteria and virulent toxines results in secondary involvement and destruction of the entire bony structure of the joint.

Understanding these propositions in the surgical world they are accepted, and surgical bacteriology, pathology and clinical observation have demonstrated them—I cannot see how it is possible to accept as a rule of practice the non-interference plan with these active and destructive pathological processes.

It is a fact that perhaps one abscess in ten, either of joints or any other tissues of the body, may be absorbed. It is also a fact that more than fifty per cent. of abscesses of joints will find their way to the surface in such a manner as to establish good drainage, and thereby allow the joint to recover under proper mechanical treatment. But what are we to do with the other fifty per cent. of cases that produce dangerous disturbances? How are we to distinguish the benign from the malignant? Without an exploration we cannot. The rule followed in cases of appendicitis should be followed in abscesses of joints, and precisely the same surgical principles should be adopted in abscesses of joints as in abscesses of any other part of the body, more particularly of the shaft of long bones. No surgeon of any reputation would ever think of trusting a case of osteomyelitis or tubercular abscesses of the bone to nature. Such conditions are always operated upon and life and limb saved that otherwise would have been sacrificed. In cases of appendicitis, no surgeon today would think of trusting such cases to nature. An abscess of the appendix ruptures into the abdominal cavity, when not surgically treated, in seventy-five per cent. of all cases; there is a mortality of over thirty-five per cent.; whereas, from early surgical interference the mortality is a fraction of one per cent. These same arguments can be

applied to abscesses of the joints. If every joint which is suppurating, whether tubercular or purulent, is operated upon, the mortality and destruction of that joint will be reduced to a very small per cent., whereas, if not operated upon, the mortality ranged from eight to twelve per cent.; and excisions or chronic sinuses lasting for years or for life will be found in a very large percentage of such cases; just what percentage, I am unable to state. I know that in my clinics at the Post Graduate, which are made up largely of cases from other clinics and hospitals, more than seventy-five per cent. are chronic diseases of the joints with abscesses involving the bones of the joint, and frequently of the pelvis, which have existed for years. Now, if such cases had been early examined and evacuated, the excisions which I am now obliged to perform could be avoided. The mortality from excisions of the hip joints probably ranges as high as three or four per cent.

Certainly, then, such cases, if early operated upon, would be unattended with this mortality. Secondly, excision of the hip shortens the limb from two to two and a half inches. Now, if all joints with abscesses were early operated upon, as soon as a diagnosis is made, in my opinion, excisions would not be necessary one time in a hundred; whereas, if such abscess cases are not operated upon excisions will result or should be performed in more than twenty-five per cent. of the cases.

Statistics from the Fifty-ninth Street institution in New York show that abscesses occur in over sixty per cent. of the cases there treated. The same is true of the Forty-second Street Hospital. From the Children's Hospital in Boston, thirty-five per cent. Now of these abscess cases—given a hundred—nature will open and take care of probably fifty per cent., and satisfactory results will be obtained by mechanical treatment. Of the other fifty per cent., on account of the favorable opening of the abscess which permits of drainage, and under careful mechanical treatment, results will be obtained in twenty-five per cent. with shortened limbs from one-half inch to two inches, with extreme atrophy, from which the patient never recovers. These results will be obtained after years of mechan-

ical treatment. Now, the other twenty-five per cent. will find their way into the various hospitals and dispensaries of the city, where they will be found to be suffering from disease of the liver and kidney, with extensive bone destruction, with dislocations of the hip, with shriveled and atrophied limbs, with great deformity, necessitating excision in nearly every case.

This is what I have observed during fifteen years of dispensary life in New York City, and we might as well look the facts in the face now as at any time.

The fifty cases which would have recovered, could not possibly have received any injury by the incision and careful drainage, because the antiseptic finger and the clean knife blade could not possibly do the infected and suppurating joints any harm. No expert diagnostician could possibly determine which abscesses would take a favorable course and which might kill. The only possible chance of constitutional consequences would be through the denuded surface which was made by the knife, and if the surgeon will thoroughly protect these surfaces by means which I will enumerate later, that accident can never occur.

The bugbear that interference with purulent or tuberculous foci will result in constitutional infection is not borne out by clinical observation. I have never seen it, and I do not believe it ever occurs. Now, all of the fifty per cent. of serious cases alluded to would at the time of incision, on account of the intelligent exploration of the joint by the surgeon, receive proper scientific care. We can see that mortality would be diminished or done away with; that excisions, on account of extensive bone disease, the result of primary and secondary infection, would be avoided. Therefore I contend, and I contend it without fear of successful contradiction—and it is sustained by clinical observation of over fifteen years, in hundreds, and I might add in thousands, of suppurating joint diseases which I have observed, that every one of these cases should be at once intelligently explored. One bird does not make a summer, and thirty-five cases of abscess of the hip selected and reported to the Academy of Medicine by Shaffer, and the

occasional reporting of successful cases of abscess treated by aspiration, revived and recommended by Gibney, followed for years by myself and afterwards discarded, because the results were extremely unsatisfactory, should have no weight against the rational treatment of these abscesses based upon etiology, pathology, surgical bacteriology, and clinical observation. The aspirator lulls the surgeon to sleep; he never knows whether he has aspirated an abscess due to a synovitis, or one due to extensive bone disease with sequestra or a separation of the head of the bone from the neck requiring an immediate excision.

Up to two years ago it was extremely difficult to operate upon suppurating hips and prevent subsequent suppuration. But with the advent of the use of pure carbolic acid as I reported at the last meeting of this Association, I have had no difficulty with such joints. The profession is indebted to Dr. Seneca D. Powell of, New York, for one of the most useful discoveries ever made in surgery. I allude to the antidotal effect of alcohol to pure carbolic acid. Powell has used carbolic acid for years in the treatment of infection and bone diseases in various parts of the body, and had recommended it for erysipelas and abscesses. I have tested it in the treatment of erysipelas, and find it is as much a specific for that disease as quinine is a specific for malarial poisoning. Observing his good results in bone and other abscesses, I applied it to joint abscesses. There should be absolutely no difference in the treatment of abscesses of the joint and the abscesses occurring in any other portion of the bone or in soft parts. My observation during the past two years has demonstrated to me the correctness of this statement.

Now we all know that pure carbolic acid cannot be absorbed. How is it that it acts beyond the area of disease? For instance, in erysipelas of the skin, the deeper lymphatics are all involved. In hip joint disease, the bacteria have found their way into the lymphatics remote from the joint, and prior to my use of carbolic acid, I frequently found abscesses appearing an inch or more from the field of operation. I can only explain it

upon a theory, and that is, that carbolic acid unites with the albumin of the tissues, forming an albuminoid or albuminate which is a powerful antiseptic. This new compound is absorbed into the lymphatics, destroying the bacteria. It must act in this way, because we observe in erysipelas the temperature, six hours after its first application, not infrequently falls to normal. In hip joint disease, we observe after its application that the temperature may fall from 104 or 105 degrees to 99 or 100 degrees in twelve hours, and it will not rise again unless other foci of disease develop.

Now the method of its application is simply this: The abscess cavity is laid open. The opening into the capsule is found, enlarged, and the joint explored. If there is extensive bone disease the incision is lengthened and the capsule of the joint freely divided one-half to two-thirds its entire circumference, the head of the bone pulled out from the socket, the curette freely used, and the joint thoroughly irrigated with bi-chloride solution one to one thousand.

The joint is now filled full with pure carbolic acid. It is allowed to remain one minute by the watch, after which the joint is thoroughly washed out with pure alcohol, and finally the alcohol is washed away with a two per cent. solution of carbolic acid.

Instead of packing the wound or sewing it up or introducing the collapsible rubber drainage tube, I use the largest glass tube that the cavity will take which extends down to the joint and is just flush with the skin. This tube not only admits of perfect drainage, but enables the surgeon to see, day after day, just what is taking place in the joint. If further suppuration or extension of disease takes place, it is usually treated through this large glass tube by curetting and the use of carbolic acid and alcohol. Packing can be introduced through the tube to secure perfect drainage from the joint. These tubes vary in size from half an inch to two and one-half inches, and are of various lengths. (Fig. 1.) A drainage tube for a small child should be about an inch in diameter. In other words, the glass tube is fitted to the parts as large as they will take, and

one can readily see the immense advantage the surgeon has day after day if he can examine the diseased area down to the very bottom of the joint. The tube is worn until granulations fill in from the bottom of the wound.

When it is not necessary to curette away pieces of dead bone or foci of disease in the neck or head, the wound can be closed with a smaller drainage tube. From nine to twelve pounds extension is applied during the bed treatment, after which my splint and crutches are adjusted and the patient sent home. I

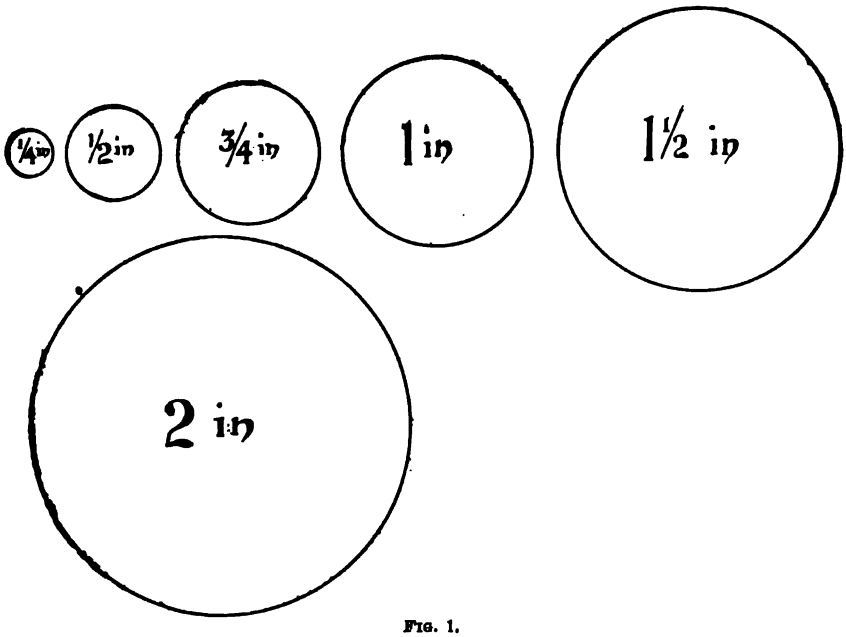

FIG. 1.

have also observed that where disease exists in the acetabulum, particularly if the head of the bone is involved, it is better to remove the great trochanter, because this bony prominence interferes with the drainage from the joint. Its removal in no way impairs the usefulness of the limb. If there is very extensive disease in the great trochanter, I invariably remove the head and neck and great trochanter, because I have observed that, in the attempt to save these structures, it was impossible to destroy the disease, which was bound to progress in the acetabulum. There have been some exceptions to this rule, but

where it is so persistent I now perform a complete excision in such cases.

If the abscess has burrowed into the iliac fossa, I immediately detach Poupart's ligament from the anterior-superior spinous process, and the attachment of the abdominal muscles to the crest of the ilium sufficiently to allow a free view of the iliac fossa. If disease is extensive, and the abscess extends back as far as the sacro-iliac synchondrosis, a drainage tube is put through from this point to the back.

Now in regard to results in the seventy operations which I have performed: In these seventy operations, in former years I would have performed at least fifty excisions. As it is, in the seventy operations I have performed twenty excisions. In all of the other cases, the joints have been freely opened, and portions of bone and cartilage which was found dead in the joint removed in nearly every one. In fifteen of the cases, the head of the bone was found separated from the neck and laid as a sequestrum in the joint. In thirty cases the disease was confined to the acetabulum with some secondary infection of the neck of the bone. In twelve cases the abscess had burrowed into the iliac fossa, necessitating an operation there. In forty cases, the capsule had ruptured anteriorly into the iliac muscle, finding its way into the iliac fossa or into Scarpa's triangle. In two cases the abscess had gone through the thigh from Scarpa's triangle, and had appeared in the gluteal fold posteriorly, photographs (Figs. 2 and 3) of which I show you here. Fifteen excisions of the hip left the hospital on their splints four weeks from the day of the excision, three left the hospital at the end of two months, two required subsequent operations, one of which left the hospital at the end of four months, and the other, with extensive disease of the pelvis, has been in the hospital five months, and will be discharged within a week or two. All of the cases requiring excisions or extensive bone operations were discharged from the hospital on an average of three weeks from the time of the operation, wearing hip braces or crutches. The wounds were firmly closed in all the cases excepting those reported as not.

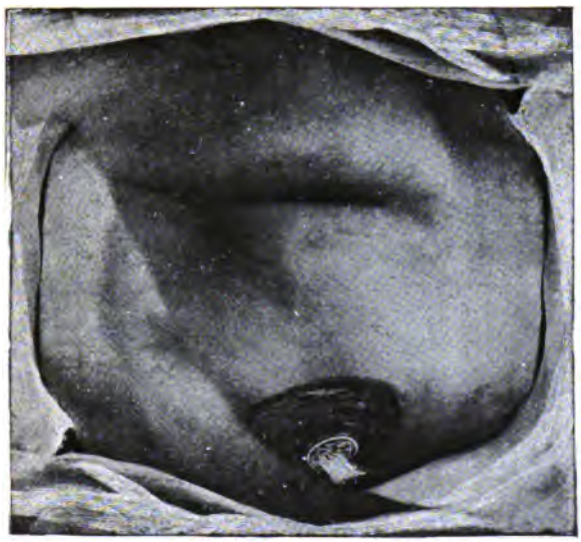

FIG. 2.

FIG. 3.

When I compare these results with what I observed before I began the use of carbolic acid in the treatment of these joint suppurations, I am highly pleased. In certain hospitals, I am informed, the wards are filled with patients with suppurating hips, many of whom have been there for years. All such cases could be gotten up and out on hip splints and crutches in a few weeks at the outside.

I am led, gentlemen, to speak thus positively because of the brilliant results, and a desire to impress upon the orthopedic profession the principles which are accepted and taught in the surgical world. I believe that we, as orthopedic surgeons, have no right to violate established scientific surgical laws.

I wish to say right here that the use of carbolic acid is used simply as an agent. It is not a specific in joint disease. Thorough surgical work, with the auxiliary of carbolic acid, to my mind will accomplish more in the cases under consideration than any other means with which I am familiar.

DISCUSSION.

DR. FRANK P. NORBURY, of Jacksonville, Illinois.—I would like to ask Dr. Phelps what method he pursues in treating tuberculosis of the wrist joints of children?

DR. PHELPS.—I use precisely the same method in children that I would in adults. Take the cases of tuberculosis of the wrist joint, and I see a good many of them, I lay the joint open, and with a sharp curette remove all of the diseased tissue; then with pure carbolic acid I am able to render everything antiseptic. I take one of the shortest drainage tubes which I show you; the granulations spring up and force the tube out.

DR. NORBURY.—In cases that are now being treated by the injection method of iodoform and glycerine, or formalin and glycerine, would you recommend opening up these cases and establishing drainage?

DR. PHELPS.—Yes, if there is any suppuration. If there is a focus of disease there, I would explore the joint and drain. Iodoform injections originated, I think, with Billroth, and

I believe they have been largely discarded in this country. I have perhaps done two or three hundred excisions in cases of that kind that have been treated by some of my good German colleagues in New York, and I have discarded entirely iodoform injections in the treatment of joint diseases.

DR. ALEX. C. WIENER, of Chicago.—I may say, while Dr. Phelps is my example in orthopedic surgery, I cannot follow him everywhere. He has omitted to mention the use of the thermometer in joint diseases, which is a very important adjunct as to early diagnosis and in defining whether we have to deal with a tubercular infection, pure and simple, or with a mixed infection. I agree with him that it is exceedingly difficult to distinguish clinically, in cases of hip joint disease, between a mixed infection and an exudation which is produced by the action of the tubercle bacillus. In cases of tubercular infection of the hip joint the temperature rarely exceeds 100 degrees or 101 degrees. The children are not emaciated. If we have a mixed infection to contend with, we get all the symptoms of sepsis and pyemia; we have grave symptoms with gravitation abscesses, as the Doctor has so eloquently pointed out.

As to the use of carbolic acid in cases of erysipelas, some five years ago I used it in erysipelas without knowing that somebody else had employed it. The erysipelatous process was quite extensive all over the face and head. I simply painted the inflamed surface with pure carbolic acid, and the patient was practically well in three days.

I wish to call attention to one feature in connection with carbolic acid. Dr. Phelps spoke of it as an excellent antiseptic. It is likewise a splendid anesthetic. I recall one case in which I removed a small atheroma by simply painting the line of the incision with carbolic acid, and the patient, who was very sensitive, did not experience any pain.

With reference to discarding the use of iodoform injections in hip joint diseases, I agree with Dr. Phelps that we should not resort to this remedy. Patients do much better with injections of from six to fifteen drops of concentrated carbolic acid, and they do not experience much, if any, pain.

I can full indorse the statements of Dr. Phelps and recommend the use of carbolic acid in the treatment of joint diseases as successful and embodied with proper precautions devoid of danger.

DR. CARL H. ANDERSEN, of Chicago.—I have been very much pleased with the discussion of Dr. Phelps' treatment in cases of hip point disease where he has infection. It strikes me as being exceptionally good and original in many respects. I can hardly agree with him, though, in absolutely condemning the iodoform injections, as I have seen several cases where good results were obtained by the use of it. Also, I do believe that it is limited to very few classes of cases, and must be used before the breaking down of the patient. I think that a great many surgeons use iodoform injections indiscriminately, but large bodies move slowly, and I think it will be only a matter of a few years before we will treat infection of the joints as we treat infection in the peritoneal cavity or other places, by thorough drainage and washing out. Dr. Phelps' idea of using the pure carbolic acid for a minute or so in the cavity and then washing it with alcohol, is certainly good. His treatment of erysipelas by the same method is original and is certainly new to me and I shall take the first opportunity I have in using it.

DR. J. A. STUCKY, of Lexington, Kentucky.—I would like to ask the essayist to tell us, in his closing remarks, whether he thinks this treatment would prove of great value in the treatment of suppuration of the accessory cavities, as, for instance, the antrum of Highmore; whether we can use it in middle ear disease. I have myself tried pure carbolic acid as a local anesthetic in opening up furuncles of the auditory canal, and have succeeded admirably with it.

DR. PHELPS (closing the discussion).—I wish it to be clearly and distinctly understood that carbolic acid is not a specific; it is part of a great surgical procedure, and whenever infection is found, whether it is recent or old, we should operate upon such cases, and then use carbolic acid, which enters for a specific purpose. I can conceive of no suppurations, no tubercular processes, where I would not use carbolic acid. I know one thing, that when I use pure carbolic acid I can kill a bug. I know that absolutely. Furthermore, I know when I have applied carbolic acid and have done it rationally, I did not destroy tissue. Some of you might say, Will not the use of sulphuric acid or nitric acid accomplish the same purpose? Yes, but you cannot control it. You can control carbolic acid, and it will kill germs to a dead certainty, when you have gotten

the specific effect from it, and I consider this is the specific effect: First, you destroy the local infection with scoop and carbolic acid; then it unites the carbolic acid with the albumin and is absorbed in the form of an albuminate in the living products, and you have a secondary effect from carbolic acid. We are examining into that question now in New York. In all old sinuses, I admonish you to immediately take one of those sinuses and follow it down to a logical conclusion. You will always find something, and you will always be sorry. If you do not do it, these cases will go on and you will see perhaps amyloid disease of the liver, of the kidney, or of the heart. If you get rid of the source of infection, and it is a piece of dead bone, you have done the best thing for your patient. You may not want to do much cutting. Use an ordinary uterine dilator; you can always get it. You can introduce your finger into the sinus or opening, and then you become master of the situation. Do not treat cases of joint disease in a haphazard manner. I tell you, that for years I followed the plan recommended by my orthopedic colleagues, and I trusted to nature. I treated my patients conservatively, and I buried a good many of them. I will tell you one thing more: Conservative surgery is doing the right thing at the wrong time, while scientific surgery is doing the right thing at the right time. There was never a dirty old sinus ever injured by putting a clean finger into it. You become master of the situation with your finger, and anticipate your excisions by years, if excision is necessary, if you find the head of the bone. If you treat these cases conservatively, next year or the year after you will do excision, if considerable destruction has taken place in the pelvis, and the patient is a hopeless cripple for life.

Do not inject iodoform into joints. I have excised a good many joints that have been treated that way. I have removed iodoform from joints months and years after it has been injected into them. You will frequently have to open joints that have been injected with iodoform emulsion, and I do not know of a better soil in which to grow bacteria than a solution of iodoform and glycerine. Iodoform does not kill bacteria, and what is the sense of injecting a senseless thing? Don't do it. Take your knife and lay the joints open. Look at them. Do what ought to be done, and you will save your patients from the horrors of amyloid disease of the liver and kidney. You will do the best thing for them. Do the right thing at the right time. That is scientific surgery.

DR. J. HOLINGER.—I would like to ask Dr. Phelps whether he has had any experience in treating sinusues of the head or of the ear that are involved in tuberculosis, and whether any experiments have been made along this line?

DR PHELPS.—There is not a tubercular or suppurative process which cannot be treated in this way. I may say, that Dr. Roosa, in New York City, is treating all cases of middle ear disease, as well as his mastoid and antrum cases, with pure carbolic acid, and washing them out with alcohol. Do not use carbolic acid unless you neutralize it. You will get sloughing. Put pure carbolic acid on your hand, use alcohol afterwards, and you may be sure there will not be any deleterious effects from it. We do not think of transferring cases of erysipelas that may happen in any ward to the erysipelas pavilion, but we apply pure carbolic acid, and then wash it off with alcohol.

DR. ANDERSEN.—How long do you leave it on?

DR. PHELPS.—I may say that the hospital I am connected with is a dumping ground for nine different hospitals in New York. We have a large surgical erysipelas pavilion, and patients with erysipelas are sent to us. We take a pair of scissors, cut the hair off, do not shave it, and we find in some cases the erysipelas extends over the entire head, sometimes down the trunk. We paint the forehead with pure carbolic acid, and when the painted area turns white we wash it off with alcohol. You should have the anesthetic effect. We go on, take another part as large as one's hand, and continue to do that until we have gone over the entire area. We take a toothpick, if necessary, and pencil the eyelids down close to the eye, and go over the surface. Mark you, the temperature will fall inside of six hours two or three degrees, and within twenty-four hours it will go to normal. We treat these cases by the hundreds and thousands. We do not leave the carbolic acid on long enough to get sloughing. These patients have a temperature, when admitted, of from 101 degrees to 105 degrees. As a rule, the carbolic acid should not be left on more than three or four minutes. When the painted area turns white and the patient says he is suffering intolerably, wash it off.

DR. RICHARDSON.—How often do you repeat the application of carbolic acid in these cases of erysipelas?

DR. PHELPS.—We have never in the City Hospital made more than three or four applications, and the disease rarely ever recurs. We do not use any internal treatment whatever.

XXIV.—PULMONARY TUBERCULOSIS IN INFANTS AND CHILDREN.

BY FRANK PARSONS NORBURY, M. D.

JACKSONVILLE, ILLINOIS.

The voluminous accumulated literature of tuberculosis shows a paucity pertaining to the especial subject of pulmonary tuberculosis in infants and children. We may attribute this to the fact that it only is within a comparatively recent period that its differential study has been made.

The more thorough utilization of the available post-mortem material in the metropolitan hospitals for children and institutions having their custodial care, tends to reveal that it is not a rarity among children, or at least among such children as find their way into these institutions.

It is to be supposed that in private practice there exist conditions far more favorable as causative factors, than in the modern equipped hospitals and other institutions of today. The selection of cases would, then, be the only modifying contributing factor to be considered when we attempt to arrive at the real prevalence of the disease.

However, we have sufficient data to warrant us in saying that it is not a rare affection among children and one demanding painstaking study to thwart its ravages.

The writer became interested in the study of tubercular affections of childhood while resident physician to the Pennsylvania Institution for Feeble Minded Children. He especially was impressed with pulmonary tuberculosis, as the first death occurring among children under his care was one of this affection. There is nothing, perhaps, in all of our later experience in medicine which stimulates inquiry into a special subject like the first death occurring in the young physician's practice.

It is not fair to consider tuberculosis as found among the feeble-minded children as the clinical criterion of the disease,

because of the obtuse symptomatology so manifest among these degenerates, and because of their heritage—viz.: a debilitated and enfeebled constitution, whereby a lessened resistance gives opportunity for greater susceptibility to infection.

We can, however, find some food for reflection both as to etiology of the disease tuberculosis, and of idiocy and imbecility by careful observation of this unfortunate class of children.

Etiology.—Heredity is of etiological importance in the study of tuberculosis, but it has lost its prestige as compared to its former standing. In the light of modern scientific inquiry infection has supplanted direct heredity as the etiologicol factor *par excellence* in tuberculosis. It is not disputed that direct heredity is responsible for a limited number of cases.

Just here, let me quote from that excellent work by Levy and Klemperer, "Clinical Bacteriology," page 268: "Cases of direct inheritance are known both in human pathology and in veterinary medicine, but their number is extremely small in comparison with the wide distribution of the disease."

Personally, I have noted drect transmission in a calf (previously reported in discussion before Ill. State Med. Society, *Ill. Med. Journal,* September, 1900, p. 173).

A cow belonging to the herd of the State Hospital for the Insane, at Jacksonville, gave birth to a well-formed calf, which lived but twenty-four hours. I was interested to know what was the cause of death, and therefore made a post-mortem examination of the calf. I found clinical evidences of tubercular infection involving the entire glandular system, with involvement of the lung. Later the mother of the calf came under the tuberculin test, and while to all appearances she was a healthy cow, yet the test showed unmistakable evidence of tuberculosis. She was killed and the post-mortem manifestations were exhibited by the State veterinarians in evidence.

Jacobi has reported finding the bacilli in a seven months fetus, while Baumgarten, Laudouzy and others have promulgated the belief, that in such cases the bacilli are transmitted during fetal life, but the germ does not proliferate until by lessened resistance the opportunity is presented.

Along this line of reasoning, perhaps there are more cases of direct hereditary transmission than we ordinarily would suppose. This same possibility exists in other infectious diseases as well.

Gradawohl, of St. Louis, *(Phil. Med. Journal,* Sept 2, 1899, p. 445), in reporting a case of Intrauterine Epidemic Cerebro-Spinal Meningitis, says this case "brings to mind the fact that the physiology and pathology of antenatal life are becoming more clearly understood by reason of the very fact that we are meeting with cases of transmission of disease in utero more frequently than ever before."

Gradawohl's case was that of a mother dying of epidemic cerebro-spinal meningitis, confirmed by bacteriological examination, and a seven months fetus, removed post-mortem, showed the same pathological involvement of the meninges as the mother. The pathogenesis of the micro-organisms removed from maternal and fetal meninges was confirmed by experimental methods.

This case clearly proves, as Ballantyne (*Am. Year Book,* '99, p. 488) has said, that the fetus is liable to the same diseases as the mother. This infection probably taking place through the blood stream.

However, the great majority of cases of pulmonary tuberculosis in infants and children are due to infection. This is proven by the fact that the disease does not appear until the child is at least three months old, and according to the studies of Comby (*Progressive Med.,* March, 1900, p. 269) there is a steady increase from nine per cent. during the first year to thirty-eight per cent. during the second year in tuberculous cases. This argues, he says, against hereditary origin, and in favor of acquired infection.

The infant and young child certainly are favorably exposed to infection. Living in the home with a tuberculous mother, where, through the mother's milk, the mother's kiss or breathing the bacteria-laden atmosphere, the avenues of infection are certainly grave and sufficient.

Again, the carelessness displayed by the average tubercu-

lous patient in the home, in handling the sputum, gives many opportunities for the creeping infant, playing upon the floor, to come in contact with the tubercle bacilli.

One of the cases coming under my observation in private practice, was an acquired case in an infant nine months old. To all appearances the infant was well developed, appeared normal until the ninth month of age, when its illness began.

The mother was tuberculous and temporarily was in Colorado Springs under the care of Dr. Scully. She did not nurse her child, but had the little one constantly with her. After a brief stay in Colorado, mother and infant returned home; the infant contracting a cold *en route,* from which resulted broncho-penumonia.

I saw the case in consultation and later assumed charge of the patient. After some days' observation, I made the diagnosis of broncho-pneumonic tuberculosis. The case ran the usual course of phthisis florida, dying four months after inception of the disease. I am sure this was a case of tuberculosis by infection, the route of infection being probably the respiratory tract, as the diet of the infant was exclusively modified sterilized milk. This question of the route of infection is an important one and one which has been carefully studied by enthusiastic observers. Northrup (1), Holt (2), Bovaird (3), Carr (4), and others have reported results based on autopsies, all of which tend to show, as Northrup expresses it, "that in the vast majority of tuberculosis in children the seat of the primary infection is the lymph nodes clustered about the bifurcation of the trachea and the roots of the lungs." The infection then takes place more frequently through the respiratory tract, the primary lesion being either the bronchial lymph nodes or the lungs..

Carr says, regarding the starting point of tuberculosis in children, "that the lesion is usually the glands, the liability being at its maximum during infancy and early childhood and rapidly decreasing later in childhood; that caseous glands, especially internal ones, may remain quiescent for an indefinite period."

It is not infrequent to find on autopsy infection of the bronchial lymph nodes, without suspicion as to this infection existing. I believe it was Osler, who found fully twenty-five per cent. or more, of cases coming to autopsy showing evidences of old tuberculosis, the patient dying of other disease.

Tuberculosis evidently starts more frequently in the thorax, than elsewhere. The infection is not necessarily through the respiratory tract for the infection may come from the intestines and find its way through the lymphatics to the lungs.

Bovaird, in reporting sixty cases in addition to Northrup, says "that in no case were tubercular lesions of the intestines or mesenteric glands discovered without accompanying tubercular lesion of the lungs and bronchial lymph nodes." Other observers confirm the respiratory tract as the most frequent route of infection, and the more frequent thoracic over abdominal tuberculosis.

Pulmonary tuberculosis in infants is undoubtedly referable to previous pulmonary infections, such as whooping cough, influenza and the catarrhal disturbances incident to measles, scarlatina, etc., which pave the way for tubercular infection, by debilitating the patient.

Pulmonary affections are responsible for a great mortality among the feeble minded—fully fifty per cent. die of these diseases.* I take it that if a more thorough clinical bacteriological study could be made of these cases, we would find more pulmonary tuberculosis existing among these children than now reported.

The intestinal tract is a route for infection in tuberculosis, but not as marked as the respiratory. The catarrhal diseases of the intestines—viz., entero-colitis, gastro-enteritis—make portals for tubercular invasion, hence the importance of regulating these diseases and the double importance of supervision of the diet of the infant.

Milk undoubtedly is a source of infection and while not having as vulnerable point of vantage in the intestine of a

*Fish. Proceeding's Association Supt. Feeble Minded Institutions, p. 218. Brown, same p. 335. Wilmarth personal letter.

healthy infant, yet let disease or fatigue lessen the resistance of the child, and infection is possible.

Kanthack and Sladen (*Progressive Med.*, March, 1900, p. 270) in their careful experimental studies of milk as a source of tubercular infection, concluded that we must regard the milk supply as a grave danger, especially to hand-fed children, young children, delicate children and to those suffering from acute disease.

The Illinois State Board of Health some years ago instituted inquiry in this field, and more recently the Board of Live Stock Commissioners of Illinois has carried these investigations into more practical application among the dairymen of Illinois. The work of Gehrman and Evans, under direction of this Board, demonstrates conclusively that the milk from cows showing the tuberculin reaction should not be used, neither should butter made from such milk be used.

Again, the flesh from tuberculous animals is unfit for food, for, as stated in the Special Report on Diseases of Cattle (U. S. Dept. Agriculture, 1896, p. 407), "experiments have shown that the flesh of tuberculous animals contains tubercle bacilli," and especially so when there is a generalized tuberculosis.

It is highly important therefore that cattle to be used as food supply should be subjected to inspection. Cattle which are afflicted should be killed and their carcasses cremated, for, if buried, however deeply, they may be dug up by dogs, and under no circumstances should dogs, cats, swine or other animals be allowed to feed on tuberculous meat. Especially is this important regarding house pets, such as dogs and cats, because coming into the house as the playmate of the infant or child, they bring unwarranted exposure to the little one.

Tuberculosis as found in the monkey is the same as found in man, as I have repeatedly seen proven in the laboratory. The tuberculosis of the fowl is closely related to that of man and later may be proven to be the same. We all recognize these possible etiological factors and their importance should impress upon us the prophylaxis of which we will speak later.

Diagnosis.—We spoke of the prevalence of pulmonary affec-

tions among the feeble-minded children, and this suggests that with the perfection of our methods of clinical diagnosis we will find, I dare say, that pulmonary tuberculosis plays a prominent role in this rate of mortality. With the clinical fact that tuberculosis easily engrafts itself upon the primary disorder, ever before us, we can understand how insidious may be its invasion and how it may escape detection altogether.

Bovaird says tuberculosis, long latent in the bronchial glands, may be roused and disseminated under the influence of the outbreak of an intercurrent disease, the symptoms of the latter entirely masking the presence of the tuberculosis.

I have seen this illustrated in my own experience, where the physical signs usual in cases found in the adult were wanting in the child. I now have a case under observation showing obscurely the clinical phenomena of pulmonary tuberculosis. The patient, an infant, unduly emaciated, without errors of digestion and progressively declining. Fever has been a feature for several weeks.

This case emphasizes Bovaird's statement regarding the early evidence of the invasion of tuberculosis, based on the records of cases that there are only two evidences of early invasion of tuberculosis—viz.: "(1) progressive emaciation not explained by any other disease: (2) continued elevation of temperature similarly conditioned."

Bertherand (*Gazette des Hopitaux;* quoted editorially *Pediatrics,* July 15, 1900) in speaking of pulmonary tuberculosis in young infants says: Tubercular babies are taciturn and easily examined. Emaciation is often marked; absence of fat causes the face to be wrinkled; the facial bones are prominent, the eyes are deep in their sockets, the mouth seems enlarged. The sutures are not united and the fontanelles persist."

This group of symptoms is also noticed in cases of malnutrition and the group in itself signifies simply a vice of absorption. Other contributing symptoms oftentimes prominently conspicuous are mentioned by Bertherand, viz.: the enlargement of the abdomen; the constricted thorax; the pale delicate skin; cold extremities; night sweats; variable curve of bodily weight, etc.

A positive diagnosis is difficult to make without the aid of clinical bacteriology, for I am sure all of us have in our studies of malnutrition in infants and degenerate children met with this entire grouping of symptoms and yet no evidence of farther decline and not infrequently, recovery.

I have under observation in my service at the Illinois Institution for the Education of the Blind, about one hundred and fifty children, many of whom have by reason of their "shut-in lives," conspicuous, *apparent* cachexia, indicative of malnutrition, disease, etc., and yet the general health of these children as compared to their fellow unfortunates, the deaf, is far above the latter class. There is no real cachexia; it is *apparent*. Hence, we cannot always depend even on the objective signs in diseases of children.

Comby classifies pulmonary tuberculosis of children into three clinical varieties: 1. Apyrexial tuberculosis, characterized by emaciation with vomiting and diarrhea. 2. Febrile tuberculosis, acute miliary tuberculosis, simulating typhoid fever, meningitis; the temperature has a high range and there is much prostration. 3. Pulmonary phthisis, in which the disease runs a course similar to that found in the adult. In older children, Comby adds two more varieties, viz.: 4. Tuberculosis of a broncho-pneumonic form, simulating broncho-pneumonia closely. 5. Pleural and peritoneal tuberculosis, sometimes curable.

My experience has been that the broncho-pneumonic form is found in infants as well. One of my most pronounced cases, confirmed by laboratory inquiry, was in an infant seven months old. The disease commencing as broncho-pneumonia to which was later engrafted tuberculosis.

Osler says the differential diagnosis between acute broncho-pneumonic tuberculosis and non-tubercular broncho-pneumonia is difficult to make and can only be determined by finding the bacillus tuberculosis.

I have noticed in children over two years of age that we have more of the physical symptoms, viz.: disseminated râles, noisy breathing and other signs usually observed in broncho-

pneumonia—together with sweating, chills, hectic fever, signs of breaking down lung tissue, etc.

The most common type of tuberculosis in children is according to the Northrup and Bovaird series of cases, acute miliary tuberculosis, and the course of the disease is apt to be confused with chronic broncho-pneumonia or entero-colitis. Differentiation, according to these authorities, is difficult, as the clinical evidences are insufficient.

Complications.—In infants we find comparatively few complications—but after two years of age complications commence to appear. Of these tubercular meningitis is the most conspicuous and severe. This disease may be found where no clinical evidence of the tuberculosis exists, but by post-mortem we find lesions of the lymph glands and apices of both lungs. Sometimes chronic pulmonary tuberculosis may have existed for some time.

Tubercular meningitis is most common during the period of childhood and is usually secondary to infection elsewhere. Osler says, "Other organs are usually involved, particularly the lungs, the bronchial glands or the bones."

I have performed autopsies where the tubercles were multiple and clustered along the longitudinal fissure. Again, they were noted attached to the meninges of the cerebellum, and along the sulci at the base of cerebrum, attached to the pia mater. The irregularities of the disease make it of clinical interest and while it is invariably fatal, yet, we learn some wholesome truths regarding prophylaxis in its study.

Other complications of great clinical interest are the tuberculous diseases of the joints and bones. These affections are, however, essentially surgical and as such need surgical care. There are other complications of importance; of these empyema is a prominent one. Ashby and Wright say, "The relation between empyema and tuberculosis is interesting and important." The question as to whether chronic empyema is essentially tubercular or apt to become tubercular is one not yet settled. Some writers, among them Barlow and Parker, state they have met with cases where they believed a tubercu-

losis was secondary to a chronic empyema. This is one of the questions to which modern pathology may contribute more light.

Prognosis.—The prognosis in pulmonary tuberculosis in infants is grave; in fact, we may say the disease is invariably fatal. In the broncho-pneumonic form the course may be rapid and usually is of a few weeks' duration. As the child grows older less grave becomes the prognosis, except in the broncho-pneumonic form, which I believe is invariably fatal. In the chronic tuberculosis of the lungs of childhood, much can be done to ameliorate and even cure the disease.

It is possible for a child to survive the invasion of the tubercular bacilli, as Osler says, "Infection does not necessarily mean the establishment of a progressive and fatal disease." I have known of two boys, brothers, afflicted with pulmonary tuberculosis to find relief in Colorado.

The post-mortem evidences even in feeble-minded children with a lowered or degenerate vitality show that lesions of the lungs may heal. This lesson teaches us not to put an unfavorable prognosis upon every case, but endeavor at once when the diagnosis is made to institute proper treatment.

Treatment.—It seems like carrying coals to Newcastle to speak of the treatment of tuberculosis here in Asheville. Hence, what I say is simply in a general way, as I came here to learn, and hope the discussion will enlarge upon the treatment of tuberculosis as found in children.

Like Holmes, we will say that to properly treat tuberculosis in the child, we must begin with his grandfather. In other words, a good heritage is the best treatment of tuberculosis, as it is prophylaxis in its perfection. But it is not given to every infant to have such an invulnerable physical reserve, and even when bequeathed with this priceless heritage other disease or accident may lessen resistance and open the portals for the entrance of the omnipresent tuberculosis bacillus.

The infant of tuberculous parentage enters life with a handicap destined to affect its entire career. The tuberculous mother has given of her substance to the limit of her powers,

to make her child a fit subject for the conflicts with the ills and woes to which the human flesh is heir, but she cannot give absolute immunity.

Hence, the importance of proper care of the infant from the date of its birth. The nursling should at once become the subject for artificial feeding, for we know the danger of the mother suckling her child. Neither should the infant live in the room with its mother; its sleeping apartments should and must be apart from those of its mother.

The suggestions made in this important part of the hygiene of the infant must be emphatic. Again, the maternal caresses instinctively given the helpless babe, must be controlled to the extent that kissing should be prohibited. The babe should live in the open air as much as possible; have a large, airy nursery and have thrown about it surroundings conducive to good living. The diet we know must be supervised; the milk must be under inspection and should be sterilized. Milk is the diet and should be used to the exclusion of other food.

I am aware that the insistence upon these conditions is many times impossible, but in the line of duty we proclaim their necessity. The infant can under well regulated hygienic surroundings mature into a child capable of withstanding the ordinary opportunities for infection.

Of these colds, catarrhal affections of the naso-pharynx need care and supervision. Adenoids should be removed. As the child develops a wholesome dietary must be provided and an out-of-door life encouraged.

To the child afflicted with the disease the open air treatment is the best; the most suitable and most satisfactory. It may be necessary to change the residence locality, or removal from the home town or city entirely; then comes the necessary suggestion as to change of climate. Whether it is to be a permanent removal to a more suitable climate or the temporary change to some sanitarium where climate and good hygiene will be the patient's lot.

The sanitarium treatment is the one distinctive advance in modern treatment; here rigid discipline, suitable dietary and a

well regulated hygiene contribute to the wholesome benefit of the patient. The open air treatment at home under strict medical supervision is as near as we can come in the average case, but the climate treatment is to be recommended even if the advantages of the sanitarium are not to be had.

The symptomatic treatment of pulmonary tuberculosis as it occurs in infants and children is practically the same as in the adult. Osler *(Maryland Med. Monthly,* Jan., 1900; p. 10) says, "The stomach controls the situation in pulmonary tuberculosis. In a long series of cases the patients who do well are those who can take plenty of food." "Fever," he says, "causes the lack of appetite and feeble digestion. Each case must be dealt with separatively, but as large a quantity of food as possible should be taken."

I have adopted Osler's suggestion regarding the use of raw eggs, even in children. One of my cases is now taking several every day and is gaining in weight. I believe the weight of the patient is the best guide for us in determining the benefits of treatment. Children are easier to keep in one dietary routine than adults. I have had a number of such patients who acquired a liking for cod liver oil—the pure Norwegian oil—and really looked with pleasure for the time when it was to be taken.

Knopf (XX Century Practice, Vol. XX., p. 231,) says, "Children and young people often develop tuberculosis for no other reason than that they are naturally bad eaters."

Hence the necessity of regulating the quantity and quality of food taken and the time of taking it. It is impossible to lay down absolute rules, but we can see that wholesome food, plenty of it and at proper intervals, be given.

In regard to the use of drugs I would say that I have used comparatively few. Cresote and creosotal I have used with, I believe, value to the patient. The creosote is given in milk in small doses, three or four times a day. Creosotal is given the same way. The bowels are to be kept open and to this end some simple laxative may be taken. I use cascara preparations with children. A general tonic is given and the simple phos-

phoric acid, in a vehicle of elixir of pepsin, improves the appetite and assists digestion. For the cough which may become persistent and troublesome I have used paregoric, heroin 1-25 gr., codeine 1-10 gr.

These may be combined with some suitable cough mixture such as the Brown Mixture, or one of the more refined preparations containing glycerine, etc. Fever is met with baths or some of the cold tar preparations administered with caution.

DISCUSSION.

DR. O. J. STEIN, of Chicago.—I was very glad to hear the essayist mention in his paper, in considering the prophylaxis, the removal of adenoids and enlarged tonsils in children, because there is no question but that an enlarged tonsil or an adenoid in the naso-pharynx predisposes a great many children, otherwise susceptible, to the more rapid infection with tuberculosis.

As to medicinal treatment, while I have not had very much experience in treating tuberculosis in children by the method mentioned, I have had considerable experience in treating adults. I see a great many cases of pulmonary tuberculosis in connection with laryngeal symptoms, and in the last year and a half or more I have adopted a method which I think is probably one of the best for quickly relieving the septic symptoms that we find in the first and second stages of tuberculosis. I refer to intratracheal injections. The treatment, as you know, has been revived by Mendall, of Paris, although it originated with a doctor in this country by the name of Green, if I remember correctly, who resides somewhere in the East. He used a large laryngeal canula with a syringe, by which he injected the various oils directly into the trachea. Personally I use a canula with a three to four-inch vertical beak, and inject by means of a laryngeal mirror below the vocal cords the mixture. In some cases I use some hydrous carbonated oil containing iodoform, about two grains, a little bromoform and the oil of cinnamon. In other cases I use menthol and guaiacol. The rationale of the treatment is just as apparent to you as it is to me. Of course, I use it in this way to obviate its administration to the patient by the mouth and thereby avoid disturbance of the stomach. It is surprising how quickly the patients react to the treatment. The symptoms

disappear rapidly, and the patients take on flesh. The appetite is increased and they tell me they feel remarkably improved, after having tried all other forms of treatment. I lay particular stress on the first and second stages of the disease.

As to the menthol and guaiacol, I begin with from two to five per cent. of menthol, and a half per cent. of guaiacol, and run it up to fifteen per cent. of menthol, and three per cent. of guaiacol to the injection. I have used this treatment in a few children, and the results have not been as good, for the reason of the inability to keep the children quiet. In children, four years of age, you can use the laryngeal mirror nicely, and introduce it by that means. If you cannot use it as you would an intubation tube, then pass the tube over the epiglottis between the cord and inject it. The menthol produces laryngeal spasm sometimes.

DR. J. H. TAYLOR, of Indianapolis, Indiana.—This is a subject which could be discussed indefinitely, but I want to say only a few words regarding one or two points brought out in the paper. I was pleased with the concise and complete description given by the essayist, who mentions the fact that children over one year of age are especially susceptible to tuberculosis, when they contract such diseases as the infectious diseases. One point in particular should be observed more by physicians, as well as by the laity, and that is the contraction of such diseases as measles and pertussis. We know that we cannot go back to the grandfather; that we cannot treat the mother and prevent the infant from having a vitiated constitution. We cannot find out bacteriologically or otherwise whether there is a latent caseous gland, either about the larynx or bronchial region. But we do know that these constitute a fertile soil for the development of the disease when it is aggravated by broncho-pneumonia, etc. Broncho-pneumonia is one of the most common and fatal diseases connected with measles. I think it is to this source that we should look for prophylaxis to prevent the development of tuberculosis in the susceptible. Oftentimes a mother says, "I do not care if my child is exposed to measles; I want the child to have it while it is young." It is the duty of the physician to impress upon mothers the different ruts into which the child is liable to fall from contracting such diseases, and especially the complication broncho-pneumonia, which furnishes a fertile soil for the breaking-down of caseous glands, causing suppuration, quick decline and death as the result of tuberculosis.

DR. EDWIN ROSENTHAL, of Philadelphia.—There is one point in the paper of Dr. Norbury that I would like to lay particular stress on. We see phthisis in children and in infants in cases where we have not had an opportunity of seeing the parents. I would like to emphasize treatment by strychnia in moderate doses, beginning, let us say, in a child of one year of age, with one-hundredth of a grain, four times a day, going up as high as the fortieth of a grain, four times a day, and then the twentieth of a grain. Persistent stiumlation is lasting. It is hard to use medicines like guaiacol or menthol to the throats of children, but try to get anything into the lungs or trachea, I think it is almost impossible. If we take infants in whom there is a lack of nutrition early, and from the beginning change the diet and begin to build them up, giving them strychnine, we can do a good deal for them. I have had the opportunity of making many post-mortem examinations on children who have died from ptomaine poisoning, alcohol poisoning, etc., and have found that in the majority of cases they had tubercular peritonitis. In many of them I found the peritoneum studded with tubercular masses. The cause of the infection in most cases was due to infected lymph nodes. Whether they were the origin of the infection I am unable to say. I am persuaded that many cases of tuberculosis in children, where they suffer from ptomaine poisoning, from milk infection, etc., are really latent cases of tuberculosis. Take a child that has a temperature of 104 degrees one day, 99 degrees the next day, with an ill-defined course of fever, if this occurs in an adult, it is not improbable that a diagnosis of typhoid fever would be made. But if the child's illness persists five or six weeks in a crowded tenement district, generally we will find tuberculosis is the cause, and the child perishes from it. These cases usually present an ill-defined incipient stage or running course of the disease.

In regard to infection, the milk supply is an important factor to consider. There are other diseases, except tuberculosis, conveyed by milk. I have seen cases of streptococcic infection as the result of using milk that had been taken from a cow suffering from abscess of the udder. This milk has been brought to the City Laboratory in Philadelphia, and careful bacteriological examinations have disclosed streptococci in it. Cases of tuberculosis in crowded districts or cities occur more from lack of good nourishment than from inheritance or hereditary causes.

DR. PAUL PAQUIN, of Asheville, North Carolina.—There are a great many problems brought up by the very excellent paper of Dr. Norbury, both with respect to the method of transmission of the disease, as well as its treatment. Much depends upon what definition we give to the word heredity, and as to whether a child is born or taken with the disease after birth or not. There is no question but that in animal life beings are born with tuberculosis contracted in utero, and I doubt not it occurs occasionally in human beings. It does not matter, however, whether the inheritance comes from within the mother's womb or outside of it in contact with her. The outset is the same, whether it comes from within or without. The child may contract the disease by lactation, or may be in a large per cent. of the cases the disease proceeds from infection from germs spread about by the parent; it arises from ignorance on the part of the mother, or others responsible. The germs of affected mothers may be distributed in the home. The new born child may be healthy, but the moment it begins to creep it puts its nose and mouth to the floor, on which expectoration is deposited, and the germs are dried. After sweeping particularly the child inhales the germs from the outset, and so we have at once a prolific source of infection.

It may be said against the theory of heredity that in civilized nations the disease is decreasing; whereas, among the Indians and some other nations, who do not come very much in contact with civilized nations, the disease is less prevalent. But the moment they come in contact with civilized nations they contract the disease readily. The nations that are civilized seem to have a certain degree of immunity.

The chief point which I wish to discuss is that we should, in my judgment, study the nature of human beings with reference to the cellular method of prevention of disease rather than consider man as a unit. We must remember that the human structure is an aggregation of cells, and that each cell has a life of its own; that there is such a thing as resistance to disease in human nature and that we must depend ultimately not so much on drugs, but on maintaining the whole structure by supporting the cells that construct it, or what we may call, perhaps, the standard of vitality. In the end protection against consumption depends on nutrition. It does not matter whether this is done with milk, beef, air, drugs, with electricity, serum or anything else. We must have a standard of nourishment, as high as it can be maintained, and it should be the purpose of

all physicians to strive to maintain that standard. Whether stimulation by strychnia is sufficient or not in treating these cases is not the only question, but a small one of many factors. We cannot depend upon any one remedy in the treatment of tuberculosis in children or adults. We must use everything that will contribute to do good. Strychnia is an excellent remedy for certain conditions, but there are others just as much or more needed in tuberculosis.

With reference to intratracheal injections, I have used preparations of menthol for over eighteen months, and my results have been in the main practically the same as those that have been referred to. I cannot say that I have had the beautiful results given to the world with regards to the subjugation of cough. I have used iodoform; I have used the various essential oils that are supposed to be bactericides to some extent in these injections and found the measure useful. The principle upon which these injections are used is that there occurs after their administration into the trachea and bronchi slow volatilization of the oils, the result being that they, being given off in the form of gas, will destroy the germs and aid in the healing processes desired. It is not a difficult matter to make these intratrachael injections. I use nothing but a common, long-curved syringe about eight or nine inches long. One can easily with this instrument inject the trachea without the aid of a mirror.

XXV.—THE GROWING NECESSITY OF SANITARIA FOR THE TUBERCULOUS.

BY WILLIAM PORTER, A. M., M. D.

ST. LOUIS.

In pursuing for a little the first thought of my subject, I do not wish to deny the potency of climate as a factor in the successful treatment of tuberculosis. From time immemorial it has been the desideratum of the sick, the Mecca to which the baffled physician directs the great caravan of the doomed. While some good may have been done by the indiscriminate recommendation of "change of climate" in tubercular cases, I also believe that the amount of unnecessary suffering and actual harm so wrought has been beyond estimate.

First of all, "climate" is a most indefinite term as we use it in the list of our remedial agents. Flint used to send his patients to Illinois and reported cures, but the victims of tuberculosis acquire the plague in the prairie states, and they, in their turn, are sent to the mountains of Colorado or the foothills of Oregon. The great tide of misdirected woe, reaching the California coast, now returns by way of Arizona and Texas to the shores of the Atlantic, while the search for an Eldorado goes on in vain.

In all of these regions there are climatic advantages that are valuable and well suited to individual cases, but the disappointment has been because patients have gone, without advice, in quest of something they knew not what, to places they knew nothing of, and the result has been too often a bitter failure. I believe that every physician, before sending a patient from home and home comforts, should thoroughly study, not only the climatic conditions of the location selected, but the needs of the individual case. If unable to come to some definite conclusion as to the fitness of the special location, the patient had better not go.

One great wrong against which the intelligent physicians at our best health resorts are protesting vigorously is that so many patients are sent to them too far advanced to be in any way benefited. It is cruelty, scarcely refined, to send a poor, infected, hopeless case of tuberculosis to some far and possibly out-of-the-way place, where food and comforts and surroundings and sympathy of home are lacking, to inspire hope that any privation or pilgrimage is helpful, to have him endure the heartaches of nostalgia and to die among strangers. No exact rule may be given for our guidance in such cases, but it is always safe to let the patient have the benefit of the doubt, when there is, and keep him at home.

It must not be forgotten that many of our best and most famous resorts are already more or less infected. Why should this be? A village or nook in the mountains becomes famous through the report from some specially adapted case. The rush begins and the *vis a tergo* creates a stampede. It is said

that one consumptive may expectorate billions of bacilli daily. What, then, must be the sanitary condition of a place where these poor unfortunates are huddled together in small rooms, fed at poor tables, mentally comparing notes as to their condition of wretchedness, heartsick for home and friends, and expectorating everywhere? It is worse than the unclean islands of the lepers.

I do not hesitate to say that the first thought of the physician when he finds a victim of tuberculosis should be *not* to suggest a change of climate. First let him familiarize himself with the conditions of the home climate and those bearing upon the death rate. Then, if confirmed in the idea of the necessity of a change, let him carefully select such a place as will best meet the needs of the case. It may be that this study will surprise him. For instance, it will be found that in our own state of Missouri, where the climate is blamed for many things, that the death rate from consumption per 1,000 of population is 1.32, which is a little less than the average death rate of all the states and territories—and in some of these the total number of deaths was very small.

The fact will also be shown that the average death rate in Colorado, California, Texas and North Carolina is greater than that of Missouri, or 1.46. It will be answered that the increased death rate of these localities is due to the number of victims who go there from other places. I grant you this and that 85 per cent. is a correct estimate of such cases, yet the conclusion is that enough of such transplanted cases die away from home to make the death rate in these resorts greater than it is at home. In other words, the exodus fails to accomplish its purpose.

I grant that for many years nothing better offered the consumptive, and even now incipient cases, well advised, have to thank the change of climate and the surroundings of the new life for restoration. Would that all patients could have, at the earliest stage of their disease, the additional aid that suitable climate might bring to what we are now learning the value of, viz., hygiene, proper food, exercise, specific medicine

and the comforts and safety of home. It is this that the sanitarium endeavors to furnish, and these helps that be found in almost every home, if the physician in charge will so direct.

The victim of tuberculosis is a menace to the public. There is need for ever increasing light upon this subject. The rich harvests of death reaped throughout the centuries have been largely due to ignorance. Results that have been accredited to inheritance are now known to be due to infection. Since the specific cause and nature of this cause have been better understood, there is more hope for eventful control. It is not a Utopian dream that tuberculosis may be relegated some day to the same list as smallpox, yellow fever and the plague. There may be outbreaks, but the restraining barriers will ever grow stronger.

After the much that has been written on this proposition I feel that I need not argue this part of my subject at length. All admit that the great danger of transmission—or portagion —of tuberculosis lies in the sputum. It is true that bacilli are found in the condensed moisture of expiration and in larger numbers in the feces and at times in the urine, but these are not the main sources of danger; it is in the mucous and necrotic masses teeming with bacilli, which are viable under certain conditions. We look at the countless seeds from a field of weeds, dried in the sun and carried everywhere by the wind, and wonder why all the vegetable kingdom is not given over to weeds.

The myriads of bacilli from one are multiplied by the hundreds as the victims congregate, and day by day and month by month the aggregation goes on. What wonder that there is so much tubercular infection and that in twenty of our principal cities there were 25,000 deaths from this cause in one year? It is not in our own land alone that this march of the conqueror is accomplished. The story is the same in England, France, Germany and wherever records are made. Even in Athens, 33 deaths out of 261 in last December were due to tuberculosis. Is it a startling proposition that at the present rate 10,000,000 of the people living in the United States will die of tuberculosis? Yet such is the estimate.

But we turn to a more hopeful view of this subject. The crusade upon the "great white plague" is scarce begun and sanitation for the limitation of tuberculosis is yet in its infancy, yet already there is a marked decrease in the death rate. Not only does the practitioner yearly record more cases of recovery, but the aggregate as shown by the health reports is convincing. The death rate per 10,000 of population in twenty cities in 1888 was 33.03; in 1897 it was 20.21; decrease in death rate 38.8 per cent.; actual decrease in number of deaths 4,547.

This certainly means that something is being done to educate and guard the public, but we are only at the beginning. I am not in favor of classing tuberculosis among the actively contagious diseases, nor in reporting each and every case to the authorities. It would be all sufficient, probably, if each case was instructed in the proper care of himself and the danger to others attendant upon his condition. Laws to enforce such instruction should be made and applied.

The advantages of the sanitarium. It is a matter for congratulation that during the past few years a new and well founded hope has been given in the advance made in the treatment of consumptives at home and in sanitaria. I believe that the education and the attention given to special cases, that must necessarily be a great part of hospital work, will do more to guard the public against the danger of infection than all the laws that could be passed.

There are two lines of treatment in tuberculosis. First—always first—the prevention of development of disease in the predisposed. As already hinted, I am not a believer in the inheritance of tuberculosis *per se,* but rather in the tendency to poor assimilation, faulty development and wrong environment. In meeting these evils the physician should be supreme. He should anticipate disease, and not be found sleeping at his post of duty and observation.

Sanitaria as educational institutions, by teaching and illustrating proper exercise, suitable diet, hygiene in its many applications and by the encouragement given by careful and conscientious reports, are helpful in many ways, and emphati-

cally so in aiding in this development and prophylactic work in the individual. The questions that are suggested by the thought of the prevention of tuberculosis, either in the individual or as regards the public, are many and varied, and the practical solution of many of them is being made. With more definite ideas of etiology and pathology, and by means of methods for earlier diagnosis, there is a decided lessening of the great fear that has so long attached to the term tuberculosis.

Tuberculosis is essentially a curable disease, and we believe that the largest percentage of cures and the best results are generally obtained in well conducted sanitaria. It is not necessary that patients should go to a far country to avail themselves of this aid. All over the country institutions are building for this purpose, some of them encouraged by the state and others under private auspices, but most of them well appointed and fitted for the specific purpose.

The first sanitarium for the treatment of tuberculosis was founded less than fifty years ago by Brehmer of Goerbersdorf. After many trials it became a success and now all over Europe and more recently in America we find these institutions that each year are adding to the sum total of lives saved. The whole world is acting on the belief that tuberculosis may be stamped out. Never in the history of medicine has there been such a unanimity of purpose, not only on the part of the profession, but of the laity as well. The pendulum is likely to swing to the other extreme, and wise measures and careful thought are needed to prevent foolish and Quixotic action. A disease which in England alone annually claims 60,000 victims is not to be lightly put down. The best institutions are needed and the most advanced ideas and positive action required.

May I mention briefly and without attempt at completeness some of the advantages of the sanitarium?

First, we accomplish much in the removal of a source of danger to others to a place where that danger can be minimized. The value of this can never be expressed in figures. If it were possible that all consumptive patients could be isolated, how soon would the disease be in abeyance! I do not urge isolation,

but I do say that where that can be urged with advantage to the individual the public is the gainer.

Second, the mental rest and quiet is a great aid. Contrast the life of an invalid at one of our so-called health resorts where he is left to the tender mercies of "mine host" of the frontier hotel, the skill of the chance physician, the companionship of others as miserable as he, and the heartsickness of nostalgia with the comforts to be enjoyed at a well conditioned "home" or sanitarium, where all sense of responsibility is removed and there is the encouragement of those who know how to give mental as well as physical aid.

Third, there is the problem of diet. Assimilation is the great antagonist of tubercular disease. To increase this function is to limit the advance of the specific invasion. Cod liver oil and the malts and a hundred other food preparations have done much in a general way, but it is only when we come to study the individual needs that we can get the best results. I believe that proper feeding, as it can be done in the well conditioned home or in the sanitarium, and nowhere else so well, is in the average case the foundation of all treatment.

Proper and well graduated exercise is, in many cases, a great help. This is frequently overdone. Exercise is an aid only so far as it is helpful to the nervous system and so far as it increases metabolism. It should be regulated by the physician and, in patients with a quick pulse and perturbed nervous condition, it should never be interdicted. Rest, food and sunshine first and exercise of body and mind later. In passing, let me say that in case of faulty development and poor respiratory action, especially at the apex, rightly adapted exercise with a view to increase the functional value of that part of the lung is of the highest importance.

The open air treatment is now being advocated. Of its value there can be no doubt, but it must be limited in its application to suitable cases. There is no reason why patients in whom it is indicated cannot live almost altogether in the open air in most of our states. At Mount St. Rose it is our intention to have large sheds built, with movable wind screens, and to

have them furnished with chairs and plain cots. Selected cases will live there most of the year and, by a very simple method devised by Dr. Ross, the cots can be warmed in severe weather and yet the patients have all the advantages of outdoor life.

In cases where there is poor functional activity I am an advocate of the shower bath or the spinal douche. There is no tonic more direct than this where there is impaired vaso-motor contractibility and consequent want of tone in all the organs and in the circulation of the extremities. The frequent flushing of the lower bowel, in conjunction with the daily use of the shower bath, will often do more to reduce the afternoon pyrexia and increase the comfort of the patient than anything else that I know of.

It is in the sanitarium that special symptoms can be best cared for. Fever that demands rest and quiet, cool sponging and the least harmful antipyretic; hemorrhage that requires prompt and efficient help; night sweats that are so depressing, mentally and physically; laryngeal complications that can often be controlled in the early stages and are the bane of the physician's life and the curse of the patient's in the later stages, these and a score of other complications are all best met in the average case in the well conducted special hospital or sanitarium. It is attention to detail that tells in so many of these cases. In no other disease is it more necessary to individualize and to change the treatment, not only to suit the particular case, but to meet different indications in the same case. It is "eternal vigilance" that is the price of success.

I will not here detain to speak of the advantage of specific medications that have for their purpose the limitation and destruction of the bacilli. I believe firmly in these methods and that in the use of creosote and of well proven serum we have an advantage that physicians of former years did not possess. These are not all, but only a part, of the treatment, and call for special care and observation on the part of the physician.

What as to results? Better, I am sure, than we dared to hope for a few years ago. In four of the best known, the Adirondack, the Loomis, the Sharon and the Winyah, all in

this country, 67 per cent. have been benefited and about 25 per cent. cured. Not only this, but who can estimate the good resulting from the better knowledge of sanitation and the value of the lives thus prolonged? What stronger argument can be used in appeals made to the state for institutions for the poor than the recital of the history of lives saved by sanitarium work? When a few citizens are in danger from a savage foe in the Orient, armies are sent to the rescue and navies are sent to the antipodes. Newspapers record the progress and the whole nation stands waiting. Is it too much to ask that the same government should show the same anxiety to release its citizens from a foe that destroys more than ever were slain in battle and to protect against a more insidious invasion than ever came in the guise of war? We need sanitaria not only for the rich, but for the poor; for tuberculosis cannot be limited to any great extent till the poor are cared for. I believe that the day is coming when the tubercular patient will be cared for as efficiently as the patient with smallpox or yellow fever, and that day cannot come too soon.

XXVI.—THE PHYSICIAN AS A SANITARIAN.

BY HUGH A. COWING, M. D.

MUNCIE, IND.

During the last decade the researches along biological lines have greatly broadened the field of preventive medicine. The microscope and culture-tube have been the scouts and sentries in the warfare against disease. Experience at the bedside has brought additional knowledge of the enemies of human life. The prevention of disease grows in interest with the people, and the demand for the services of sanitarians was never so great as at present.

Dr. Henry B. Baker, of Michigan, has well said: "Eminent men in the medical profession have prophesied that in the future the duties and labors of physicians generally will become more largely preventive than curative of disease. While this

may prove to be true it would seem to be more in harmony with the general laws of progress that there should first occur a division of labor—a separation of the profession into specialties, one being devoted to preventive and the other portions to the several branches of curative treatment. It seems to be admitted, however, that a broad culture in all of the medical sciences supplies a good basis for the training of a specialist in any branch of medical practice; and preventive measures are expected to apply to every disease treated by any specialist. The general good of mankind, therefore, calls for an interest in and some knowledge of sanitary science and its practical application in public health work on the part of every physician."

The ideal physician, therefore, is an ardent sanitarian, employing the various prophylactic measures known to modern medicine, and through his precepts and practice along sanitary lines will lessen disease, and thereby reduce his patronage, he seeks no equivocal course in his life-saving efforts. His intelligent patrons make frequent and sometimes urgent demand upon his services as a sanitarian. He rises to professional success as a schoolmaster, teaching and training his patrons in the prevention of disease. He is called not always because of the potency of his pills and powders, but often to give advice upon the many subjects of preventive medicine. It may be concerning the clothing of the infant, or the question of bathing, of feeding, of ventilation, of isolation, of immunization, or of disinfection; of these and many kindred subjects he speaks among his people as one having authority.

Prof. A. C. Abbott declares: "As an educated physician he should know, and as a conscientious physician he should practice, these precepts for the good not only of his own patrons, but of the community of which he forms a part. The medicine of the period tends more and more in the direction of prevention, and if the physician proposes to keep himself abreast of the times it is imperative that he be in touch with the advance along these lines. While ignoring the subject a new medicine grows up about him and he is suddenly aware of his presence in an atmosphere unfamiliar and wholly uncongenial—an at-

mosphere that he does not appreciate and with which he experiences no intelligent sympathy."

For the physician who is a sanitarian the hygiene of infection is a subject of inexhaustible interest. The causes of infection, its geographical distribution, modes of dissemination, portals of infection and prophylaxis: these and other phases of the subject afford him food for thought. In time, perhaps, he has joined the army of scientific writers, and the result of his research is written down in the great book of sanitary science.

The physician who is a sanitarian is rarely, if ever, a factor in the spread of contagion. His instincts and training lead him to studiously avoid the possibility of his becoming an agent in the transmission of disease.

But what shall we say, on the other hand, concerning the physician who takes but little or no interest in sanitary science? I scarcely need to remind you that a great many physicians are criminally indifferent and careless after visiting contagion, taking no precautions in change of clothing or personal disinfection. The fever thermometer, that common carrier of disease, is transferred from mouth to mouth without disinfection, and other instruments are frequently used in the same criminally reckless manner.

The conscientious physician, after exposure to contagion, will, at he earliest opportunity, make a change of clothing and disinfect exposed body surfaces. In my own county I know physicians who reserve one or two suits of clothing for contagious cases. A long rubber coat in winter and linen duster in summer are also sometimes used. But these precautions should not entirely be depended upon.

Several years ago a physician in my own city, while attending a case of scarlet fever, carried the contagion to his little daughter in his beard. He became so impressed with the lesson that he at once sacrificed the hirsute appendage, and ever since has been clean shaven.

The question is sometimes asked, Should a physician refuse obstetrical calls within twenty-four hours after attending smallpox, scarlet fever, erysipelas, diphtheria and measles?

The answer to this question has not materially changed since Dr. O. W. Holmes wrote his essay on the Contagiousness of Puerperal Fever. Let no physician be lulled into a sense of false security by resorting to moderate precautions under such conditions should necessity call him to the puerperal bedside. The personal preparation of the physician at such a time should be more thorough, if possible, than that of the most painstaking laparotomist before operating. Without a knowledge of bacterial origin, but by clinical evidence alone, Dr. Holmes proved conclusively the infectious nature of puerperal fever. Yet now, after more than fifty years have elapsed, with the side lights of bacteriology and microscopy thrown upon puerperal infection, there are physicians who recklessly pass from cases of contagion to midwifery. To such practitioners the words of Dr. Holmes apply: "It may be that offenses or diseases will come, but woe unto him through whom they come if we catch him in the voluntary or careless act of bringing them!" "Whatever indulgence may be granted to those who have heretofore been the ignorant causes of so much misery, the time has come when the existence of a private pestilence in the sphere of a single physician should be looked upon not as a misfortune but a crime."

During the past two years a mild form of smallpox has appeared in various parts of the United States. The attitude of some physicians toward the disease reflects no credit upon the profession. While the ignorant or indifferent or obstinate physician refused to accept the diagnosis of smallpox the infection spread and life was endangered and business interests were disturbed.

Quite recently Dr. Hatfield, of Chicago, stated: "The hard common sense of the Nineteenth Century has decreed that the treatment of smallpox should be under the direct supervision of the state since as yet no other effective means have been devised to prevent the spread of this extremely contagious disease. Hence the first thing to be done is to report all suspicious cases to the local board of health, and let them take the responsibility in the matter."

In 1893 smallpox was epidemic in Muncie, Indiana, with 150 cases and 22 deaths. In view of the interest which should exist among physicians relative to smallpox now prevalent in the United States, I desire to repeat the lessons of that epidemic as formulated by the writer.

1. Domiciliary quarantine is ineffective in preventing the spread of smallpox, especially during an epidemic.

2. It is economy, in the beginning of an epidemic, to provide the most comfortable and commodious hospital quarters with the best medical and nurse skill obtainable.

3. Then let the authorities and medical profession unite to secure the removal of all afflicted to the pest hospital.

4. As a rule, a well appointed hospital, with faithful medical and nurse service, offers better conditions for recovery than if the patient remains at home.

5. By early removal of patients from the home the danger of infection to others is greatly diminished.

6. The details connected with the removal of the diseased to the hospital, the burial of bodies, the disinfection of houses and personal quarantine of infected persons, and persons exposed to infection, and the liberation of the infected from quarantine, should all be under the supervision of the health officials.

7. During an epidemic of smallpox all public meetings should be discontinued, and persons should be warned from entering houses where sickness is known to exist until the character of the disease is clearly defined. Foolhardy and criminally careless persons should be prosecuted to the full extent of the law.

8. Railroad quarantine should require not merely disinfection of baggage, but also a change of all clothing possibly exposed, or a thorough disinfection of the same.

9. To suppress epidemic smallpox, there must be a mutual and intimate bond of harmony and support between health officials, physicians and citizens.

10. An unusual prevalence of varicella, especially of a severe type, should be reported by the attending physician. Under such circumstances the health authorities should take all precautions. The history of smallpox epidemics shows that in many instances they have been preceded by varicella.

11. The history of this and of former epidemics proves that vaccination, isolation and disinfection are the three important factors in stamping out an epidemic of smallpox, and, unless necessity arises, there should be no hesitation on the part of the authorities in enforcing all these measures.

12. Aseptic bovine lymph should always be used. All care and attention should be thrown around the vaccinated subject and every precaution should be taken to protect the vaccine wound against infection.

The discovery of any contagion is made usually not by the health officer but by the physician in attendance. By the timely counsel of the latter there may be secured the early enforcement of preventive measures and thus quench the small but deadly flame of contagion that threatens the household and community.

A few weeks ago in my neighborhood the wisdom and advantage of such precautions were forcibly illustrated. One of our local physicians was called to see a woman who had severe backache and headache and a temperature of 104 degrees F. He learned that she had recently visited in a town where an eruptive disease prevailed known locally as "Cuban Itch." Although variola had not existed in our city for several years, yet the attending physician at once suspected that the woman had smallpox and so reported to the local health authorities. Rigid quarantine was at once enforced. Within twenty-four hours the case developed the diagnostic papular eruption of smallpox. Thus through the keen foresight of a cautious and intelligent physician the disease was controlled in its incipiency.

It is occasionally charged that health boards are becoming more and more autocratic and to an offensive degree, and that physicians and citizens frequently suffer injustice because of their imperialistic methods. Rarely can this charge be sustained. The health officer who seeks the greatest good for the greatest number will cause some hardships to the few. It is true that the power of the health officer should be wisely used. His training should not cease with a thorough knowledge of sanitary science. He should also be gifted with discretion, yet

withal be firm. He should secure the confidence and coöperation of the people. His work is educational in a large measure. With his fellow-practitioners his relations should always be friendly if possible. As insisted upon by Dr. A. W. Brayton of Indianapolis, in an address before the last meeting of Indiana health officers: "There should exist between the health officer and his brother physicians a spirit of friendliness, of education and the merging of all sectarianism in the fact of their common mission under the holy name of physician. Health officers should always keep in mind the true significance of Shrady's definition of health boards—benignant autocracies, and not exceed their real power and beneficence."

In conclusion, I desire to call your attention briefly to our public schools. The physician who is a sanitarian is deeply interested in the school life of the child. It is a fact that the school buildings of today, with few exceptions, are unsanitary and unattractive. In heating, lighting, seating and ventilation health rules are generally ignored. The recent investigations of Drs. Würdemann of Milwaukee, and Allport of Chicago, prove that conditions in school life are not favorable to children. The general health of school children should frequently be investigated. Their eyes and ears should be regularly and systematically examined. Ergographic tests in school children recently reported by Dr. Christopher of Chicago, indicate conclusively that the high-pressure and unphysiologic methods of teaching inevitably lead to overstrain and irreparable damage to the child. School authorities and teachers are beginning to appreciate the great importance of this neglected phase of education.

Dr. J. C. Culberton of Cincinnati, for years has earnestly advocated a revolution of conditions for the child at school. He would take the children from the crowded tenement-like school buildings of older Cincinnati and place them by street car transportation each day in sanitary school houses in the country.

This interest in school sanitation among physicians who are not health officials is an index of the increasing interest among intelligent physicians in the general subject of sanitary science.

XXVII.—PREVENTION AND MANAGEMENT OF INFECTION OF THE BREAST DURING LACTATION.

BY C. S. BACON, Ph. B., M. D.

CHICAGO, ILL.

It is almost unnecessary to refer to the importance of this subject. The fact that the majority of nursing women have wounds of the nipple of greater or less extent, that these wounds result in much suffering, that they frequently become infected, that the infection often extends to the breast and causes abscesses, and not infrequently long continued suppuration, shows that the management of the breast is one of the most important obstetrical questions. Moreover, the fact that the disturbance of the breast is the cause of much sickness and mortality among infants makes this an important subject of pediatrics.

At the beginning I wish to call your attention to the distinction between infection of the breast and simple hyperemia or congestion of the breast. This distinction is necessary for it is important that the difference between the two conditions should be kept in mind. The establishment of the milk secretion is always attended with more or less painful congestion of the breast, and later the breasts are liable to become painfully distended whenever the interval between nursings is unusually prolonged. Infection of the breast on the other hand is always attended with fever, and while it is often confounded with simple congestion, it is entirely a distinct process.

Formerly we heard much of the so-called "milk fever" which comes on during the first week of child-bed, about the time of the swelling of the breasts, and which was attributed to the establishment of the milk secretion. It is now well proven that this fever is due to genital wound infection. While the secretion of milk, like the secretion of other glands, is attended with a very slight local rise in temperature, this increase

in heat amounts only to a few hundredths of a degree, can be measured only by a delicate thermometer, and cannot properly be called fever. Hence the term "milk fever" should entirely be abandoned. If there is no infection there is no fever. Hence we have to consider only the nature, cause, and the diagnosis of infection of the breast as a basis for the study of its prophylaxis and treatment.

It has been found that the staphylococcus aureus, and the staphylococcus albus, and in some cases the streptococcus pyogenes are the infecting germs. It is well known that the staphylococci always, and the streptococci frequently, are found on the skin and in the ducts of the cutaneous glands. They are found not only around the nipple but also in the milk channels, and in the milk drawn from sterilized nipples. While it is doubtful if the streptococcus albus found in the milk is the cause of infection even if there is an abrasion of the lining membrane of the milk ducts, there can be no doubt that the bacteria found in great numbers on uncleaned nipples are a source of danger. Various sources of contamination are the clothing, the fingers of the mother and nurse, and the face and hands of the child. The mother's nightgown, the child's dress and bib often soiled with overflow milk are often contaminating agents. The finger of the mother or nurse frequently soiled by coming in contact with lochial or fecal discharges when used to draw out the nipple, or cause its erection for a better application of the child, is a common source of infection. Perhaps one of the most dangerous infecting agents is the head or hand of the child. For several years I have noticed that severe infection generally occurs in patients whose babies have boils or pustules on the body, or sore eyes. The pustules open spontaneously, and the pus smeared over the face of the baby is rubbed into the nipple when the child is put to breast.

There is some dispute between those who hold that germs enter the breast only through the nipple wounds by way of the lymphatics and those who believe that the milk passages are also the routes for infection. The general presence of an abrasion in the epithelial layer of the nipple, in cases of in-

fection, and the direct route from the erosion to the depth of the breast furnished by the lymphatic channels which are favorable routes of most pathogenic bacteria, favor the now generally accepted conclusion that the latter is the route of breast infection.

The differential diagnosis between infection of the breast, and simple congestion, on the one hand, and genital wound infection on the other hand, is very important. Simple congestion of the breast is generally important as a disturbing factor only during the first days of lactation. While it is often attended with tenderness the chief characteristics of an infection, namely, chills, fever, etc., are absent. As soon as these symptoms develop all doubt concerning the diagnosis between congestion and infection of the breast must cease.

The differential diagnosis between genital wound infection and breast infection must be made by a study of the predominant local symptoms. The greatest difficulty is experienced when symptoms of infection coincide with pelvic tenderness, distention of the breast, and soreness of the nipples. In such a case the determination may require some delay.

An important point in differential diagnosis is the determination of the question whether the infectious process has resulted in the formation of an abscess or not. The center of the infection and abscess formation is often quite deep and the determination of fluctuation is difficult. The use of diagnostic aspiration with the large hypodermic needle is in such cases the proper procedure. If fever or local pains continue for more than two or three days in spite of proper treatment the diagnostic puncture should be made.

Coming now to the subject of the paper, the prevention and treatment of breast infection, we first have to ask, what, if anything, can be done to prevent infection before lactation begins? The laity, as well as the profession, quite universally believe in various local applications, sometimes astringents and sometimes ointments, to the nipple. To develop a retracted nipple some kind of a suction apparatus is frequently used. The latter, I believe, to be of very doubtful value and not to be

commended. Fatty substances on the nipple serve as bacteria catchers and so are of questionable propriety. The tanning of the skin of the nipple by astringents will not last long after nursing begins. I believe all that need be done is careful attention to cleanliness during pregnancy and especially careful washing of the nipple with soap and water. In this way the skin of the nipple is made healthy and resistant, and there will be no accumulation of bacteria when the child is first put to breast.

In this connection it is important to remember that a person in good health resists infection better than one with poor digestion, poor circulation, and poor excretion. Every one has observed how differently infection develops in different patients, and we may conclude that these differences are due to variations in the resisting powers of the patients. If two women have similar wounds, contaminated with bacteria from the same source, one will become infected and the other remain unharmed, because the tissues of one immediately resist the invasion of the germs and the tissues of the other do not. It is also a common clinical observation that in one patient an infection may begin in the breast and in a few hours may disappear completely, while in another patient an infection of the same kind may persist, apparently disappear for a few days, reappear, and eventually terminate in an abscess. Such differences in the progress of breast infections, like similar differences in infection of other parts of the body, must be explained by differences in resistance of different individuals.

It therefore follows that all measures tending to the improvement of the general health both before and after confinement are most important in the prevention of breast as well as all other infections.

In child-bed or after nursing begins the two principal points in prophylaxis are to avoid contamination with bacteria and to avoid or heal as quickly as possible the nipple wounds. To meet the first indication it is necessary to remember the most important sources of infection. The common practice of nurses and patients of taking hold of the nipple with the fingers to

draw it out for the child to grasp, is quite unnecessary and should be forbidden. When the nipple is not erected spontaneously a little pressure on the breast outside of the areola is generally sufficient. If it should seem necessary to take hold of a retracted or flat nipple the finger should be protected by sterilized gauze.

The danger from the child is from pus escaping from boils, or pustules, or sore eyes. The pustular eruption on the neck and face of the child, resulting from the easy inoculation of its tender skin with pus germs, is a source of great danger, for the unobserved rupture of a single pustule and the scattering of its bacteria is the most common source of infection of the nipple. The management consists in the careful opening of each pustule when it is ripe, the surrounding skin having been thoroughly washed with alcohol and evacuating the matter, leaving for some time the open pustule covered with cotton saturated in alcohol. If the open pustule is on the face it may be closed with a small drop of collodion. When the face has been contaminated with matter from sore eyes it should be carefully washed before nursing. If one is uncertain how well the washing is done it is safer to use a nipple shield until the danger is past.

Suppuration in the glands of Montgomery, while not common, is, while it exists, an important source of danger. Some mechanical injury produced by the nursing child, or by a badly fitting nipple shield, may set up an infectious process. The proximity of the nipple makes such a suppurating gland dangerous. It should be opened like the pustule on a child and should then be sealed with collodion during nursing.

The general precautions consist in washing the nipples before nursing with clean water and washing it after nursing with 75 per cent. alcohol to protect the nipple abrasions from accidental infections from the mouth or skin of the child, and in covering the nipple always with sterilized gauze laid over the breast or attached to the shirt to prevent contamination with soiled garments or bedclothes. As a disinfectant, alcohol is chosen because it is harmless to the child, and at the same time

fairly efficient. Other disinfectants, like carbolic acid or sublimate, cannot be used on account of the danger of poisoning the child. The popular boracic acid is of very little disinfectant value, and is practically worth no more than water.

The liability of the nipple to abrasions and wounds depends considerably upon its shape, size and formation. The most serious wounds, like the deep transverse and perpendicular fissures, are due to malformation of the nipple.

When a nipple is small and not easily grasped, or when, because of the small size of the openings of the ducts, the milk flows slowly, the child must pull very hard on the nipple, and the chances for the production of abrasions are increased.

The length of time that the child is at the breast is also important. If the child nurses for one half of an hour, or one hour, or lies at the breast practically all night long, the nipple is, of course, macerated, and wounds are easily made and infected. For prevention of nipple wounds, as well as for their cure, the nipple shield is of very great importance. Properly made and used it not only saves the mother from much suffering but also protects her from the dangers of infection. Many of the shields on the market are improperly made. Frequently they are too short and the nipple cavity ends in a small opening into which the nipple is drawn and pinched. Frequently the shields are too small and the nipple is painfully constricted at the base. The flange is often too narrow and improperly formed. The best shield is made of glass with the nipple directly attached. The rubber shield does not give sufficient protection. The flange should be smooth, flat, and nearly at right angles to the bowl, and large enough to cover the areola. The bowl or nipple cavity should be so large that the nipple is not constricted, cylindrical in shape, and deep enough so that the nipple is not pulled too firmly against the end. It may open into a small bulb which serves as a milk reservoir. Such a shield may be used temporarily or intermittently, as the case may require, during the first four weeks of lactation. Attention should be given to its care that it may not become a source of danger. The nipple should be removed and thoroughly washed

after each nursing. After washing its outside it should be turned wrong side out and the inside thoroughly washed. Then it should be dried with clean gauze and placed with the shield, which has also been thoroughly washed with running water, or boiled, in a piece of clean gauze. The common practice of putting the shield unwashed into a cup of boracic acid solution and letting it stand for hours is an abomination that should not be tolerated.

When nipple wounds become infected, but before there are any symptoms of general infection or involvement of the deeper breast, the local wounds may be treated like similar wounds in other parts of the body. The application of cotton saturated with alcohol is generally efficient. Nursing through a shield may be allowed.

The appearance of the symptoms of chills and fever generally indicates a deep infection of the breast. When this appears nursing from the affected side should be entirely stopped and the breast should be supported and put to rest by a proper bandage. Treated in this way 80 to 90 per cent. of all breast infections will terminate without abscesses. The nipples will heal, and the infective process will be localized and controlled by nature's inflammatory reaction. Should an abscess form under this plan of treatment, which will happen very rarely, it will be small and confined to one lobe or part of a lobe.

For supporting the breast and putting it at rest the simplest form of bandage will often suffice. This is a plain piece of muslin 6 or 7 inches wide, encircling the chest. Its mode of application is very simple but important. The nurse should distinctly understand that the breast is to be raised and supported and not compressed; with the patient lying on her back, the bandage under her, the nurse takes hold of one end of the bandage with one hand and the corresponding breast with the other, draws it up to the middle of the chest and holds it there with the bandage, and the patient is directed to hold the breast in this position with the hand of the same side, the fingers being extended. Then the other breast is raised and held in the same way. Afterwards the bandage is fastened by several safety

pins, the lower border being drawn more tightly than the upper. If the bandage tends to slip down because the patient moves around more or less strips of bandage over the shoulders might be used to hold it in place.

The double Y bandage holds the breast better than the circular bandage just described. It is made of strong cotton cloth, and consists of a back piece 4 to 5 inches wide and 14 to 20 inches long. To each end of it are strongly sewed two diverging strips, each 4 to 5 inches wide and about 13 inches long. The lower limbs of the Y's which go under the breast are fastened together in the front with safety pins, then the upper limbs in the same manner. The upper and lower limbs of the Y's in front may be fastened together with safety pins to better support the inside of the breast. With this bandage the nipple of the sound side may be left free, so that the nursing of the child will not require unfastening the bandage. If the circular bandage be used it must be unfastened every time the child nurses from the well side, or an opening must be made over the nipple. In case such an opening is made to allow the child to nurse it will be necessary to protect the nipple and areola during the interval between nursing by a pad of gauze inserted under the patient.

Another form of bandage that may be used with very good results, especially in cases of infection of both breasts where nursing must be entirely stopped, is that recommended by the late Dr. P. A. Harris. It is a roller bandage, and its mode of application is somewhat difficult to describe, although quite easily understood when one sees it applied. This bandage might also be used to enclose only one breast. I will first describe its mode of application when only one breast is affected and when the sound one is left exposed for the nursing of the child. A roller 3 inches wide and 10 to 12 yards long is required. Both breasts are covered with absorbent cotton and a small pad of cotton to protect the shoulder is in readiness. Beginning outside of and below the affected breast the bandage is carried twice around the chest, passing first across the front, then it is carried under the affected breast and again around

the chest and the second time over the shoulder. Then it passes again under the breast, the lower half of which is now nearly covered, and around the chest above the well breast. The next turn comes directly over the nipple of the inflamed breast, and above the well breast. Two or three more turns then cover the remainder of the affected breast. If any bandage remain a firmer support to the breast will be given by making a turn again under the breast and over the shoulder, and still another under the affected breast and above the well one, finishing with an extra turn over both breasts. The bandage must then be well fastened with 12 to 20 safety pins placed in front, back, and at the sides. Then the cotton over the well breast may be removed and an opening made for the child to nurse.

When both breasts are to be enclosed 5 or 6 yards more of bandage will be required. Begin with two turns around the body, and one turn under the first breast and over the opposite shoulder as before. The bandage is then carried under both breasts and over the back, across the shoulder opposite the second breast, down in front and under the breast again. Then it goes around the body, under the first breast, across the front part of the chest over the shoulder, under both breasts again, and across the back, and over the shoulder opposite the second breast, and again under the second breast. This turn may be repeated the third time if necessary. Then the bandage is brought under the first breast, now nearly half covered, above the second breast, across the back, above the first breast, under the second breast, thus forming a figure of eight around the breast. This may be repeated if necessary, and then the bandage is fastened with two turns of bandage around the chest over both breasts. This breast bandage must also be fastened with numerous pins. It is convenient to make the first turn with the patient on her back, and have her sit while applying the rest. Much care should be taken in applying the bandage just tight enough, and on this account the patient should be asked frequently if comfortable. If the bandage is too tight it soon draws heavily upon the shoulders and becomes unbearable. A very valuable adjuvant to the treatment of breast in-

fection is the application of cold by means of the ice bag. This not only has great influence in relieving the pain but also modifies favorably the infective process. It can be applied satisfactorily only when the patient remains in bed. It is indeed desirable that the patient should always keep in bed at least for two or three days. The ice bag is used in connection with the Y circular bandage. The thick layer of cotton which is employed in connection with the roller bandage interferes with the action of the ice. The large size round bag is best. The ice should be broken quite fine and the bag made to conform to the contour of the breast. If the infected lobe be on the outside the bag is placed against the affected spot and supported by pillows or blankets. When the infected region is in the upper or inner side of the breast the bag may be laid upon the chest.

Under this plan of treatment, in almost every case, we shall find that the pain has largely disappeared in 24 hours. At the end of 48 to 72 hours the local tenderness has disappeared and the nipple is healed. The ice may now be removed and nursing may be resumed, the child being allowed to stay at the breast not more than 4 or 5 minutes at a time. If nursing increases the pain it must of course be stopped for one or two days more.

If, in spite of this treatment, some tenderness continues or reappears after a few days, and if suspicion of fluctuation with perhaps a slight increase in temperature occurs we must suspect the presence of pus. As was previously stated, this question can be easily and safely determined by the use of a proper hypodermic needle. If an abscess is present, however small, it should be opened at once. If we are in doubt as to the presence of an abscess a continuance of the bandage support and the ice bag can do no harm, and is the best possible method of limiting the abscess formation and controlling the symptoms of pain and tenderness until the diagnosis and the need of an operation can be definitely established.

Under the treatment of poultices, which was formerly so prevalent, it was frequently advised to allow the abscess to develop until a considerable portion of the breast was broken

down before opening it. This unsurgical procedure resulted from the unfortunate experience that so many had with the continued development of abscesses in the lobes surrounding the first attack.

The obstetrician could not assure his patient that one operation would be sufficient unless he waited until a very large abscess cavity was formed. The operation of opening an inflamed breast was so much dreaded; without an anesthetic it was very painful, and if an anesthetic was used a big operation requiring assistance was necessary. The method of infiltration anesthesia has been of very great value to patients having abscesses of the breast, for by its use an abscess may be opened without pain, and so may be opened early. If a second or third abscess develops it may likewise be attended to with little trouble and expense. The manner of using the infiltration anesthesia is very simple. After a careful disinfection of the skin a few drops of Schleich's solution No. 2, applied with any ordinary hypodermic syringe which has been rendered aseptic, anesthetizes the short line of incision. After the incision the pus is washed out with sterilized water and a few sterile or iodoform threads introduced for drainage. A strict antiseptic dressing is then applied and the breast bandaged very firmly. In 24 hours the drainage is removed. The wound is kept open by irrigation for a day or two longer, when it will generally close of itself.

By this management we shall not see the extensive destruction of the breast, the long continued suppuration, the fistula, eczematous skin, worn out mother, and puny child. If we come across these neglected cases we must of course treat them according to the rules of surgical procedure which apply to such cases. These rules are too well known to need any further description.

XXVIII.—THE GIRL AT TWELVE.

BY JAMES H. TAYLOR, M. D.

INDIANAPOLIS, IND.

The girl at twelve is at the threshold of an ordeal marked by its vicissitudes of development and characterized by the most important metamorphosis in the physical, intellectual and moral nature of female existence. It is a period paramount to all others in a woman's life. The environments surrounding her at this time reflect her future destiny. Here are sown the seeds which bear the fruit of womanhood. Here is the soil in which is to be nurtured the embryo of the succeeding generation. Here are gathered the basic elements upon which the superstructure of maturer years is founded. It is the physician's duty, as well as his honored privilege, to guide such an one through this the most critical period of her existence.

The girl at twelve may be slightly below the average age at which puberty begins, yet many bloom into womanhood even prior to the age of *ten*. Many have become mothers at the tender age of twelve, and some even at an earlier period. This is a lamentable fact—a reflection upon good morals, a disgrace to society, and stigma upon Christian civilization. The reasons for a more careful scrutiny of these cases are manifold, and the conditions which necessitate reform are manifest on every hand. Better civilization demands better education from a physical, intellectual and moral standpoint. While this applies to both sexes I am convinced that the girl when she arrives at the age of puberty should be managed along somewhat special lines. She is undergoing a physiological change that demands such exercise as will cause an equable development of the entire system. Calisthenics and the various exercises of the gymnasium are to be recommended. Violent exercise and heavy lifting are contra-indicated, as they are etiological factors of uterine displacements. The clothing should be loose about the abdomen and hips, thus giving freedom to muscles in these

regions. Skirts should be supported by straps from the shoulders. Corsets should not be tolerated, as they cramp the muscles, embarrass respiration and distort the abdominal and pelvic organs.

Constipation is not uncommon at this age, and, when chronic, is an exciting cause of congestion, displacement and other disturbances of the uterus, a source of infection as well as an insidious factor in the production of various nervous disorders. Care should be taken to prevent this condition by insisting on regularity at stool, and an observance of all simple rules pertaining to the proper digestion and assimilation of food. No harm can result from acquainting the child with a few plain facts regarding the causes of constipation and the many discomforts which follow.

I would also have the mother acquaint the child, modestly and in plain terms, with a knowledge of the ordinary signs of menstruation as a preventive measure against the evils which result from undue exposure. Beyond this I would defer a more detailed study of physiology for maturer years. It should fall to the physician to differentiate the causes and nature of the various ailments and anomalies incident to this transition period. Premature menstruation—a "show" preceded by the menstrual molimen—a condition in which there is incomplete general development, demands attention. One of the causes —heredity—is unavoidable.

Immoral environment and the local mechanical causes which incite the habit of masturbation may be corrected. Two sad cases of masturbation at the age of nine years (one from the midst of older depraved associates, the other from a wealthy family) have come under my observation. Premature puberty resulted in both cases. This imperfect development, while heredity was a predisposing factor in one case, immoral association in the one and mental overtaxation in the other were exciting causes which might have been avoided. The causes of delayed menstruation or retarded puberty should be carefully studied and the environment, which is a strong etiological factor, be changed to correct the evil in each individual case.

Overwork in school and an early participation in social pleasures, on the contrary, produce congestion and predispose to a premature establishment of the menstrual function. For many years I have held the position that girls at the age of puberty, when not immune, should be especially guarded against zymotic diseases—such as typhoid fever, scarlet fever and smallpox. Besides the unfavorable prognosis at this age and the numerous unpleasant sequelæ, there is a special tendency in the last named to inflammation of the ovaries resulting in a variety of pelvic inflammations and serious uterine disturbance. I am convinced from the researches made by Tait and others, that perimetritis and kindred diseases of the female organs result from the exanthemata. If orchitis in the male result from mumps and the kidney suffers inflammation in scarlet fever, why may we not look for disease of the uterus and its appendages?

When I was a lad, I heard an uncle censure a farm hand severely for working a *young* horse. He said, "That colt is too young. You will stove him up, stunt his growth, and ruin him for sale or service." Who takes the pains to censure the merchant or the manufacturer who prematurely harnesses the delicate female child and "works" it from six in the morning until six at night, chiefly to his own aggrandizement? It is wrong even to impose such a task upon the boy. To impose it upon the girl is a sin. During menstruation there is pelvic hyperemia—a condition requiring absolute rest—and yet these girls are compelled, from four days to a week out of every month, to work right on. Headaches, anemia and other evils may result. That matters not. They will "lose their job" if they rest. Show me a girl with a few years of such work and I will show you one who has no appetite, who has no ambition for work, who has lost flesh, who has become pale and anemic, and who has arrived at a period where she is unfit to perform the functions intended for her sex.

In my investigations among these young working girls I have noticed that they sit many hours in strained positions, breathe vitiated air, eat cold lunches, ride home in crowded cars, and seek a night's rest among tenements where the con-

ditions are far from being conducive to health. Besides, these girls lose that portion of their lives when the brain is most active and receptive, and are therefore deprived, to the detriment of their progeny, of a proper education.

Mental overtaxation is as much to be deplored as physical. Girls must be educated, but they do not require the same training as boys. If, as is conceded by good authority, menstruation resides in a nervous mechanism, then we are justified in the belief that rest is essential during the performance of this function. I am ever ready and willing to write an excuse for a girl, in her early menstrual periods, to remain away from school during said period; and I consider a teacher who declines to accept the excuse guilty of a crime. Loss of appetite, headache, anemia and many conditions of ill health result if the mental is overtaxed at the expense of the physical. Girls who inherit a nervous organization and who are overtaxed in school are more prone to hysteria and similar disorders. The limit of education should not be arbitrary. That which is received with ease by one will quickly undermine the health of another. In no case should the brain be developed at the expense of the physical organization. Skene says, "Usefulness should lie at the foundation of a girl's education, and that education should aim to make women in all that the name implies; that a knowledege of how to be attractive and agreeable is a power of great value to a woman who wishes by charming and attracting those who are to guard and sustain her; that music, art and the modern languages are far more necessary to woman than man; that personal beauty and becoming dress are too often today obliterated from the girl educator's calendar." A poor, yet intelligent woman, while nursing her only child in a serious illness, said to me, "Doctor, I wish I had spent *more time* in learning to cook and take care of children, and *less* in the study of philosophy, Greek and higher mathematics, I think I would have made a more useful wife and mother."

Lawson Tait most aptly expresses my opinion on this subject in the following: "Those who advocate the equal treatment of the sexes must bear in mind that great culture in man does not

unfit him for paternity, but, on the contrary, will help him in the struggle for existence, to maintain a family. For women, on the contrary, exceptional culture will have infallibly the tendency to remove the fittest individuals, those most likely to add to the production of children of high-class brain power, from out of the rank of motherhood."

"The girl at twelve" requires especial care in her education in morals. That element known as moral character is the sine qua non of the corner-stone in the monument of woman's usefulness. Now is the time when it may take on the form of beauty and grandeur; or it may disintegrate under the disseminating rays of evil influence.

The girl at twelve is filled with a full share of modesty—is unacquainted with the human microbe ever present and ready to infect her virtue. Yet she is sympathetic, nervous, impulsive—her very nature flexible and susceptible to the bending influence of her environment. This is the time paramount in her youthful career when advice, teaching and example should be based upon the fundamental principles of morality. No one knows more about the mistakes and wrongs incident to this period of life than the physician; and he alone, being in closer touch than any other person, may do much to counteract these evils. There is a law which imposes a penalty upon one who gives or sells liquor to a man under twenty-one years of age. I believe a similar law that would impose a punishment on any person who would sell a ticket to or admit a young girl to a public ball room should be enacted. The curfew law should be rigidly enforced in every city of our land. I do not wish to sermonize, yet I cannot refrain from expressing the opinion (which a large experience in public and private charity justifies) that more hell originates in the ball room and in indiscriminate midnight rambles (and is more far-reaching in its results) than from any other source. The homes for friendless girls, the public and private lying-in hospitals and the sealed lips of the medical profession could bear me witness. If I were going to inaugurate a new plan for the reformation of mankind I would send fewer mission-

aries to foreign lands and concentrate the combined influence of the moral element of society upon our American girls, who are to be the mothers of the succeeding generation.

In the early part of my professional career I saw a case of chronic epilepsy in an unmarried woman, then twenty-four years of age—from a respectable and at one time wealthy family. She had menstruated once at the age of ten and a half years. At the age of eleven (no flow having appeared in the interim) her parents consulted a physician. Emmenagogues were administered with no avail. A digital examination with subsequent exploration, per speculum, brought negative results. A recital of this case (the details being from a most reliable source) is to show that the examinations or "medical tinkering" produced in this beautiful girl the habit of masturbation, which, in the judgment of every medical man who has seen the case, caused the epilepsy. Several cases have come under my observation where "medical tinkering" and the indiscriminate use of medicines to "help nature establish the menstrual function" have resulted disastrously. The more I study the functions of the generative organs of this period of life, the more do I deplore the "giving on general principles" of emmenagogues; and I am sure that the cases requiring examinations and mechanical assistance are in a very small minority. The physician's advice is almost daily sought relative to abnormal conditions pertaining to the female sex, and not infrequently he is confronted by the mother and her young daughter, who have come to consult him about the latter's *"not coming around regularly."* More tact, delicacy and patience than usually obtain should be employed in these cases. Sometimes the trouble is the result of a nervous breakdown, due to overwork in school. Sometimes the decline is coincident with an insidious tuberculous development, and rarely there may be organic disease of the uterus or its appendages. Or there may be "adolescent anemia," which a prominent author terms "a disease of civilization." I was consulted about a girl who had been treated by three different doctors consecutively for nearly a year. The patient

had taken enough medicine to supply a hospital during the Spanish-American war. She had not been out of doors for three months, and had grown so morose, so melancholy and so bashful that to hold an audience with her was next to an impossibility. This was an only child. I found the mother to be hyperindulgent and a monomaniac on the subject of medicine and disease. The mother was sent for to nurse an invalid sister and I persuaded the daughter to live temporarily with an aunt. All medicines were discontinued, the surroundings were made as cheerful as possible; all sorts of excuses were made to get her out of doors and keep her mind off of herself. Within three months she had regained her former health, and expressed a desire to return to her school, from which she had been absent for nearly fifteen months.

Iron and other so-called tonics are sometimes indicated, but cheerful environment, more sunshine and less medicine would be a good motto for more physicians to follow in these cases. Now and then we meet cases which demand special treatment, and perhaps surgical aid. Such should be referred to the specialist who is skilled in their management.

The girl at twelve, as I have viewed her from various standpoints, is one of the most interesting objects of study in human life. She is earth's angel, poised upon the pedestal of innocence and virtue. She is the passion flower of youth, just budding out from the tender stems of infancy and early childhood, enriched by the gentle showers and warming sunshine of maternal influence. If the flower wither in its growth or degenerate into an inferior species, it is due to the deteriorating effects of unwholesome environment. Nurtured in the balmy atmosphere of domesticity and developing into the fullness of maturity under the ripening influence of American institutions, if it fade prematurely and lose its beauty and splendor, the florist having it in charge has failed to perform the functions of his office. If its petals be broken and its tender form bend so low as to kiss the earth from which it sprang, then its admirers have lost their interest and permitted rank weeds and plants of coarser nature to crowd it

out, till its form, its charms and its fragrance are irrevocably lost.

The lips of every dying mother whisper, and from the recesses of the grave of every departed mother comes a voice exclaiming:

Awake, O mothers of the twentieth century! Adopt prophylactic measures to preserve the youthful form and normal purity of your sex, ere the insidious moths of modern society carry their work of devastation beyond repair. Yet throw the encircling arm of charity about the slightly tarnished unfortunate, and cast her not, as some are wont, irrevocably into the pool of social leprosy.

Awake, O women's clubs of temperance and reform! Guard your youthful maiden from the pestilential hand of unwholesome toil that is indiscriminately sapping her physical strength, to the detriment of her usefulness.

Awake, O educators of our youth! Spare the girl at puberty from the dire influence of mental overtaxation and excessive culture that dazzle the brain, undermine and wreck the nervous system and send so many prematurely to their graves.

Awake, O medical mind, guardian of the physical, mental and moral nature of mankind! Lend a helping hand, and aid in solving the problem of transporting the girl at twelve through the stormy seas of puberty to the ideal shores of true womanhood, where truth and virtue prevail—the home of all the elements essential to the development of the purest type of motherhood.

DISCUSSION.

Dr. William F. Barclay, of Pittsburg, Pennsylvania.—There is a moral tone in the paper just read that should be endorsed by every physician. It is sometimes, perhaps, a mistake on the part of physicians to look lightly upon the subject just discussed. I was never more impressed than I was within the past four weeks by a young school girl who came to my office with a bundle of books under her arm. She asked if I was a doctor and I told her yes. She began to cry and I said to her that it was impossible to advise her until I knew

what was the matter. I said, "Why do you cry? Why are you distressed?" She was seventeen years of age; she had been met in going and returning from the school building by an actor, who finally induced the girl to accompany him to a house where he seduced her and gave her syphilis. Now, gentlemen, nothing in my experience has ever impressed me more than that case. She begged of me not to say anything about it to her parents. I said, "I do not know your parents; I do not know your name." She did not tell me her name, and I told her that I did not want to know it. From her clothing and appearance she was undoubtedly a girl of good family. I inquired of the girl as to whether her mother had ever given her any advice as to sexual matters, and she said she had not. I never saw a girl more distressed, more contrite, than this girl. I feel that the duty lies with the physician. We should advise such mothers in regard to the care of their daughters. I know that many physicians smile at things of this kind, but they are serious, and there is far more of it than is generally supposed. I know from my own observations, as one of the high schools in Pittsburg is within a block of my office, that many young men loiter along the sidewalks, talking and enticing young girls, and while it is not fair to impugn their motives, I often fear they are doing work which will blight the lives of these young girls.

DR. J. A. STUCKY, of Lexington, Kentucky.—I feel that the thanks of the Association are due to the essayist for the timely paper he has just read. This subject is one that comes close home to every man who has a daughter and a son. We ought to teach our patients, and teach the parents of our patients, especially, that they are to keep their bodies clean, and when clean, their bodies have clean functions to perform. I believe that we, as a profession, have been guilty almost of criminal neglect in instructing our patients as to the laws of life. It is not immodest to know the laws of life; it is wisdom to know them. I have accomplished a good deal with my patients when they come to me with a neurosis of the larynx, or some trouble with the ear or throat, particularly girls from twelve to fifteen years of age, by advising them to procure a copy of Mary Wood Allen's little book on "What the Young Girl Should Know About Her Own Body and Its Functions," and they get along much better.

DR. JOHN B. LEARNED, of Northampton, Massachusetts.—I want to say a word or two with reference to the school training of children, especially girls. I know of no error today so great as the one I am about to refer to, and which is acceded to by the American people. I have seen a good deal of the West and hence when I speak of the American people my observations are not exclusively restricted to the people of New England. This error exists in too early training of our boys and girls. We are too anxious that they shall obtain diplomas at the age of twenty or twenty-two, and pass as educated men and women without regard to physical development, without regard to the brain as a steady and useful organ from youth to old age, but we merely think of their culture, scholarship, and attainments, which should be acquired later in life and not too early at the expense of proper physical development. I think the errors of a hundred years ago did not surpass those at the end of the nineteenth century in reference to the education of our boys and girls.

DR. A. P. BUCHMAN, of Fort Wayne, Indiana.—There are some things in the paper, as well as in the discussion, that I disagree with. I do not believe there is a time in the existence of a child, from its birth until it has arrived at the age of puberty, but what is susceptible of education, whether it be the development of gray matter or muscle; whether it be the development of any organ or set of organs. As a matter of course there are true and false educations. The false education is to teach people that any one organ, or the function of any set of organs, in the human body is more ignoble than the function of any other organ or organs. It is as necessary for a young girl to menstruate as it is to breathe, and she should be educated to breathe properly, and also be taught to menstruate properly. It can be done and it is false modesty not to teach such things. A gentleman not long ago in visiting the Samoan Islands made the acquaintance of a gentleman and his daughter who belonged to the upper classes, and he said he was not in their presence more than fifteen minutes before he found that he was the immodest one. They knew nothing of false notions, false personalities, and as the result their purity was above suspicion. I am in favor of increasing the gray matter, the muscle, the mind and body of our boys and girls through which the soul has to act. The body is the tenement of the soul, and the soul is

the only tenant of the body. The body is an instrument through which the soul acts, and the more the body as an instrument can be educated, the better will be the individual the better the race, the country, the nation.

DR. EDWIN ROSENTHAL, of Philadelphia.—I wish to relate an experience I had not long since. When I was chairman of the Section on Diseases of Children of the American Medical Association, last June, I went to considerable trouble to get men to read papers and devote one session to the consideration of school children. I did this in answer to Mr. Bok, editor of the Ladies' Home Journal, which has a circulation of one hundred thousand copies monthly, who wrote an article in which he stated that we were having yearly fifty thousand imbecile children thrown upon the American people by their mothers and fathers. I invited to attend this session Dr. Stuver, of Wyoming, who spoke of symmetrical development; Mr. Bartlett, who spoke of school breakdown; Dr. Fenton, who discussed eye-strain; Dr. Lautenbach, who spoke of adenoids, and others who took part in the discussion. The result of all my trouble in getting up this symposium was that there was not more than a baker's dozen present to talk about it.

XXIX.—THE CURABILITY OF INEBRIETY BY MEDICAL TREATMENT.

BY T. D. CROTHERS, M. D.

HARTFORD, CONN.

The increasing numbers of inebriates in this country who are appealing to medical men for help is an unmistakable evidence of a new realm of practice. Every general practitioner recognizes this fact, and it is confirmed by the great variety of prescriptions for alcoholism seen in all the modern works on therapeutics. The question of the action and injurious effects upon the body from alcohol is also the topic of an increasing number of papers in both journals and books. The question of medical treatment and cure of inebriety is asked and answered in many ways by both scientists and charlatans

until the subject has become one of the prominent themes of practical medicine in many medical circles.

The "gold cure" delusion, with its claims and pretensions, has practically disappeared, like a similar delusion of a century ago called "Perkinism," and his "tractors," which began with the claim of a great discovery by an unknown man. After a few years of boasted cures, it passed away and was heard of no more. Perkins claimed that by metallic tractors magnetic currents were generated, which drew out the disease, and from 90 to 95 per cent. of all cases were cured by these means. The "gold cure" promoters asserted that they had discovered a combination of drugs which was a specific for inebriety, and from 90 to 98 per cent. were cured by it. Both of these delusions attracted a great deal of attention at one time, and practially the "gold cure" has been helpful in creating new interest in the disease of inebriety and the possibility of cure by the use of drugs and other remedies.

How far the "gold cure" treatment has been followed by permanent cures is unknown. Several statistical studies have recently been made in answer to this question. The following is an example: In a study of one hundred inebriates, treated at "gold cure" asylums, made ten years after the treatment was given, it was found that 62 per cent. of all the patients were dead. Of this number, forty-seven died from drink excess; of the remainder, six died in asylums developing insanity from drink, seven from pneumonia, and two from accident. Of the thirty-eight living, only five were known to be total abstainers. This compares very strikingly with the results of many studies of the great temperance revival movements. In these instances, hundreds of persons have signed the pledge and claimed to be converted and permanently cured. Eventually it has been found that after ten years not more than from 2 to 4 per cent. continued total abstainers. The various temperance revivals which have concentrated so much enthusiasm and hopefulness of cure finally all dwindle down to less than 5 per cent. of permanent restorations.

In the first asylum for the scientific study and treatment

of inebriety at Binghamton, N. Y., in 1874, it was ascertained from a study of the history of eleven hundred cases, who had been treated ten years before, that over 60 per cent. remained cured, and were at that time abstainers. In other asylums, from similar studies and inquiries of patients made ten and fifteen years after treatment, from 35 to 50 per cent. remained restored and temperate. Studies of my work, and that of others, along similar lines in this country and in Europe, show conclusively that from 30 to 40 per cent. of all inebriates, who were under treatment from four to six months, have continued sober ten, fifteen or twenty years after. While these statistics are not final, they are very hopeful, and indicate that, from a further study and more perfect means of treatment, the curability of these cases may take equal rank with that of other diseases.

Inebriety is now recognized as a distinct neurosis, due to degeneration of the ancestors in part to physical and psychical injuries, and also to the corroding and destructive effects of alcohol.

There are certain defects in growth and development which create peculiar susceptibility to the anæsthetic and paralyzing action of alcohol. Persons of this class have very marked symptoms of neurotic disease.

The continued or occasional excessive use of spirits up to intoxication is not a disease, but is a symptom of some central irritation or exhaustion, and also of poisoning and starvation. Many of these cases are self limited, and follow a certain course, dying away after a time.

This is seen in the history of many persons who permanently abstain both from apparent or obscure causes. Thus, one who has repeatedly signed the pledge and broken it will finally, under exactly similar circumstances, pledge himself to abstain and become a total abstainer ever after. Another person will claim to be converted and stop drinking over and over again, relapsing each time, then finally abstain permanently under the same condition.

Other more striking cures are noted of persons who, after

a long period of excessive use of spirits, stop at once, and never use them again. They are unable to give any rational explanation or reason for this change, but state that they concluded to stop and did so. The same reasoning and conditions occurred repeatedly before, but always without permanent cessation of the drinking. This unexpected change and dying out of the drink symptom is ascribed to many very insignificant causes, and especially to the means and remedies used last. In reality, it is due to some physiological change in the brain and nervous system, by which the drink symptom becomes exhausted and died out. Frequently organic disease appears after this change, and always invalidism of various degrees and intensity.

This self limitation of inebriety should always be recognized in the treatment. If the predisposing and exciting causes can be removed, this condition will be encouraged, and may take place at any time. The fact of disease is apparent from a clinical study of many cases. Thus, from a grouping of the conditions which enter into and act as exciting and predisposing causes, there appears a marked uniformity in the origin and progress of such cases. When the histories of many inebriates are compared, the same regularity and progressive movement is observed. It may be stated as a fact, to which there are few exceptions, that all cases of inebriety have a distinct origin and development, progress, decline and termination. This is frequently so marked that distinct predictions can be made in the prognosis, and the case can be traced with nearly the same certainty as typhoid fever or tuberculosis.

In insanity, many definite pathologic conditions are traceable. In inebriety, a wider, more complex range of causes appear—the line of march is often seen in more general laws of dissolution. Its medical treatment must be based on some clear conceptions of the nature of inebriety and the conditions present in the person to be treated.

This requires a careful clinical study of the symptoms, tracing them back to causes and the varied conditions in the progress of the disease. From such a study, heredity will appear to be the most frequent early predisposing cause. One of the

questions will be, What conditions of life have been most active in developing these inherited tendencies? How can these conditions be checked and prevented?

Another class of cases commonly noted are those due to injuries and exceptional mental or psychical strains and drains.

In a third class, inebriety seems to be due to psychical causes, of which the mental contagion of individuals and of conditions and surroundings are most prominent. These causes are often combined and blended together, requiring very accurate study to discriminate the principal factors in each one. These are some of the causes and conditions which provoke the early use of alcohol, and give form and direction to the progress of the case.

The second part of the clinical study of inebriety is the pathological effect of alcohol. What injury has it caused? How far has it intensified all previous degenerations, and formed new pathological conditions and sources of dissolution? Also, what organs have apparently suffered most seriously from the drink impulse? And, most important of all, how far is the use of alcohol a symptom or an active cause of degeneration? Having ascertained these facts, the medical treatment is the same as in other diseases—viz.: the removal of the exciting and predisposing causes and restoration of the vigor of the body.

The first question is the sudden or rapid removal of alcohol. If the patient is alarmed, and intensely in earnest to abstain, he will consent to have the spirits removed at once. If he is uncertain, and has delusions about the power of alcohol to sustain life, it may be necessary to humor the patient in some cases. But the removal of all spirits at the beginning of the treatment is always followed by the best results. The reaction which follows can usually be neutralized by nitrate of strychnia, one-twentieth of a grain every four hours, combined with some acid preparation. Sodium bromide, in 50 or 100 grain doses every three or four hours, will break up the insomnia and cause sleep the first two nights.

Strong solution of quassia, in ounce doses, given every hour, soon break up the drink craving. Solutions of cinchona bark

will produce the same results if repeated frequently in large doses.

The withdrawal of spirits should always be followed by a calomel or a saline purge, and a prolonged hot air or hot water bath, followed by vigorous massage. Hot milk, hot beef tea, and, in some instances, hot coffee, are very beneficial. If the patient insists upon a gradual reduction of the amount of spirits used, strychnia, one-twentieth of a grain, should be given every two hours. This will be followed soon by a distaste for spirits. The purge and hot bath should be given every day while the spirits are used. The form of spirits should be changed from the stronger forms of liquors to wines and beers. Some of the medicated wines are useful at this time, or spirits served up in hot milk. There is no danger of delirium from the sudden withdrawal of spirits, particularly where baths and purging are used freely. The two conditions to be treated at this time are poisoning and starvation. The system is saturated with ptomaines from alcohol, and suffers from defective digestion. The nutrition is also impaired and organic growth retarded. Saline or calomel purges, with baths, meet the first condition, and foods and tonics the second. Not infrequently the withdrawal of spirits reveals degrees of brain irritation and exhaustion that are really manias, deliriums or states of dementia and melancholia.

Many of the chronic cases of inebriety reveal dementia when spirits are removed; others show well-marked paresis or tuberculosis.

Symptoms which were attributed to the action of alcohol are often found to be due to previous degenerations. In one case the stupid talk and conduct while using spirits burst into marked dementia when the drug was withdrawn.

In another case, the wild, extravagant conduct and boasting of the inebriate appears as paresis when free from spirits.

The removal of alcohol is often followed by tuberculosis, not suspected before, which has been called "galloping" phthisis, because it goes on so rapidly to a fatal termination.

Rheumatism and neuritis are very frequently associated both with the excessive or moderate use of spirits.

Diseases of digestion are common; also diseases of the kidneys. The latter are usually masked by alcohol and burst into great activity when it is removed.

These and other organic diseases suddenly come into view, and whether they have existed, concealed by the action of alcohol, or have started up from the favoring conditions of degeneration caused by spirits, is not known. The therapeutic requirements must reach out to meet all these unsuspected disease states which may appear at any time.

The removal of spirits in all cases reveals conditions of both physical and psychical degeneration that call for a great variety of therapeutic measures.

The next question is to ascertain the special exciting causes and remove them, and also to prevent their recurrence.

In the periodic cases, the early favoring causes of the drink storm are often reflex irritations from disordered nutrition, exhaustion, and excessive drains or strains. Later, a certain tendency is formed for regular explosions of deranged nerve energy and impulses for alcoholic relief often due to expectancy. This periodicity is often due to causes which may be seen and prevented by remedial measures. In certain cases, nutrient and sexual excesses are followed by a drink storm.

In other cases, constipation, over-work, neglect of hygienic care of the body, irregularities of food and sleep, emotional excitements or depressions, are followed by the same drink storm or alcoholic craze.

A vast range of psychical causes have been noted. Thus, a residence on the seashore or in high altitudes sometimes provokes this thirst for spirits, and removal to higher or lower planes is followed by its subsidence. Many persons never use spirits except in large cities or at specially exciting gatherings, or on holidays and festive occasions.

Here evidently some defect of the brain, either organic or functional, exists, which should be treated therapeutically. Many of these cases have been cured by change of surroundings as well as medicines.

While the ostensible object of medication is to stop the

drink craze, this is as far from being curative as the suppression of pain by a dose of opium.

Conditions which cause the disordered nerve force to concentrate in cravings for the anæsthesia of spirits are to be neutralized and prevented before a cure can be expected.

The use of narcotics and drugs to check the desire for spirits at the beginning is temporary and always uncertain. Opium, chloral, and cocaine, given freely at this time, often simply change the craze from drink to these drugs, which are ever after used in the place of the spirits.

The return of the drink impulse at regular or irregular intervals is in most cases preceded by premonitory symptoms, which, if known, enable the physician to use preventive remedies. In certain cases, calomel and saline cathartics, with porlonged baths, rest or exercise, according to the requirements of the cases, have been found preventive. Quassia solutions, given at this time, frequently break up the desire.

In a certain number of cases, patients are unconscious of the approach of the drink storm, and hence are more difficult to treat. But when they realize its coming and seek assistance, the task is easier. The general principle of treatment is sharp elimination through all the excretory organs and the use of mineral tonics, with changes of diet and living; also, a particular study of the exciting and predisposing causes and the use of active remedies for their removal. When the drink paroxysm has passed away, then radical constitutional remedies are to be used. The history of syphilis calls for mercury, arsenic, and potassium.

Defective nutrition requires a study of the diet best suited to strengthen and build up the tissues.

Entailments from other diseases, as malaria, rheumatism, and various affections, require appropriate remedies.

Tinctures of any sort are dangerous. The susceptibility to alcohol is so great that the smallest quantity is felt, though it may not always be recognized.

Where spirits are taken continuously, the system is depressed, all functional activity is lowered and palsy and starvation are present.

The removal of alcohol is only a small part of the treatment. The demand for alcohol is a symptom of this progressive degeneration. Giving remedies to produce disgust for the taste of spirits or to break up the craving for it, is not curative. Apomorphia, mixtures of atropia, hydrastin, and a great variety of allied remedies, are all dangerous. While apparently breaking up a symptom of the disease present, they often actually increase the degeneration by their irritant narcotic properties and depressing action on the organism. The indiscriminate use of these and allied drugs in the various specifics for inebriety is dangerous empiricism. It is the same as giving opium or other narcotics in every instance of pain and suffering irrespective of all conditions and calling the subsidence of the pain a cure. Thus, the following case, a periodic after a "gold cure" treatment, developed into acute dementia, which ended fatally. In other cases, mania, pneumonia, rheumatism or nephritis develop from the chemical suppression of the drink impulse. In all probability, the narcotics used were active or contributing causes to the particular organic diseases which followed.

The masked character of inebriety makes it dangerous to use narcotics beyond a certain narrow limit. Cases which have been subjected to active drug treatment to suppress the desire for spirits, are feebler and more debilitated than others. Those who have taken the so-called specifics are marked examples, and whether they use spirits again or not are always more enfeebled and degenerate.

In all these cases there is so wide a range of causes and conditions that specific routine treatment is impracticable.

Strychnin has recently come into prominence. In some instances where the spirits are withdrawn, its action is pronounced as a stimulant. Given in one-thirtieth grain doses four times a day for a time, then discontinued or given in larger doses for a shorter time, the results are usually good.

In some cases certain susceptibilities to the action of strychnin are noticed, and where the drug is taken to prevent the drink attack, it frequently rouses it, seemingly precipitating

the condition which it is supposed to prevent. This is often seen in the muscular tremor and nerve twitchings that evidently come from strychnin when used even in small doses. Strychnin should never be given alone, except immediately after the withdrawal of spirits. At other times, combined with cinchona or other vegetable tonic, it is an excellent tonic. Care should be taken to watch its effects on the motor nerves, and to be sure that the patient is not unusually sensitive to it.

Belladonna, atropia, cannabis indica, hyoscyamus, and drugs of this class have a limited value, and should be used with great caution in states of irritation following the withdrawal of spirits. They are best given in combination with other drugs for a brief time, and in particular cases.

The bromides are valuable in the same way, and in the same conditions, only in much larger doses than mentioned in the text-books. From 50 to 100 grains for a single dose are required, always accompanied with hot baths, and never continued more than two or three days.

Coal tar preparations are of uncertain value as narcotics but may be used in certain cases with good results.

In treatment of cases, after the paroxysm is over, frequent changes of the form of the tonics are most valuable. Iron, phosphorus, arsenic, potassium, and bitter vegetable tonics should be alternated with free intervals for periods of months.

The various derangements of the system should be watched and treated with appropriate remedies, and every case should be constantly under medical care.

The facts of the case having been studied, the question of where the medical treatment can be applied to the best advantage must be determined from the case and its surroundings.

If at home, the physician must have full control, and his directions carried out implicitly. When the drink paroxysm appears, the course of treatment must be prompt and exact. In one case the patient goes to bed and is secluded from all sources of excitement; in another, he is sent away to the country, and among strangers; in a third case, a few days' residence in a hospital or asylum under the care of a physician is sufficient.

Hospital treatment, with its exact care, and physical and psychical remedies continued for a long time, gives the strongest promise of permanent restoration. Wisely adapted medical treatment, based on a careful study of each case, makes it possible for the family physician to treat these cases in the early stages with success.

In the early stages, the family physician should study the exciting and predisposing causes and treat them heroically, using chemical, hygienic, mental and moral remedies freely and persistently.

When chronic states are present, the same heroic, persistent treatment should be carried out. Often a fatal mistake is made in trusting the patient's own judgment. While his co-operation should be sought, his opinion is always unsafe, and cannot be followed.

No single remedy is capable of meeting a wider range of conditions than the Turkish or hot air baths, with free massage.

Next to this are hot and cold shower baths, and hot packs, with free rubbing.

Bitter tonics and salines, with regulated diet, are next of importance.

Free elimination through the bowels, kidneys and skin are always essential.

Beyond this, the good judgment of the physician should determine when to give narcotics and when to abandon them, always remembering their danger, and very uncertain, temporary action. Also that the cessation of the drink craze is only temporary. If this is accomplished by drug and chemical restraint alone, the permanency is very doubtful.

The subsidence of the drink symptom, by the removal of the exciting causes and building up the system to greater vigor and health, is the only rational treatment. In this, the highest medical judgment possible and the greatest therapeutic skill are essential to success.

The medical judgment which will determine the exact condition in each case and the possible range of remedies requires,

not any one drug or combination of drugs, not so-called moral remedies, not appeals to the will power, but a clear, broad, scientific application of every rational means and measure demanded.

A large number of these unfortunate cases are distinctly curable in the early stages, and later, when chronic conditions come on, the possibility of cure continues to a far greater degree than is commonly supposed.

It is the common observation of every one that a certain number of cases recover from the apparent application of the crudest empirical remedies and psychical agencies used in the most unskillful way. This fact furnishes the strongest possible reasons for believing that when inebriety shall be studied and treated as a disease more generally by the profession, a degree of curability will be attained far beyond any present expectation.

The present empirical stage of treatment should rouse a greater interest and bring the medical treatment of inebriety into every-day practice. Then the family physician, and not the clergyman and the quack, should be called in to advise.

XXX.—FURTHER OBSERVATION OF THE CLINICAL APPLICATION OF THE SUPRARENAL CAPSULE.

BY W. H. BATES, M. D.

NEW YORK CITY.

The aqueous extract of the suprarenal capsule is a true astringent, constricting the blood vessels, thus preventing exudation and bringing about the contraction of inflamed tissues. Although we describe the extract as an astringent, its action is unlike that of the so-called astringents of the pharmacopœia—nitrate of silver, tannic acid, iron salts—all of which have some escharotic action.

The suprarenal extract constricts the blood vessels, but without any destruction of tissues, and it may be used in any quan-

tity for long periods of time without injury. The great advantage of the extract is that it does not act like a foreign substance, a drug or a poison, but its action is similar to the vaso-constriction which takes place in the various tissues in health. Because the suprarenal extract is an internal secretion of the body (Dreyer), may explain why its continued use generates no so-called habit or immunity, and why it has no objectionable after-effects.

Preparations.—The dried and powdered suprarenal capsule of the sheep can be obtained. It keeps indefinitely. An efficient solution is prepared by mixing one part of the powder with ten parts of water, let it stand a few minutes and filter. The filtrate is ready for use. It should be used immediately, as it soon spoils, or it may be sterilized and preserved by heating it to 212 degrees F. for one hour. A sterile solution is prepared from the fresh glands by Armour & Company, which I find very convenient. It is very efficient. I know of no substance which will preserve the suprarenal extract in solution without impairing its astringent property in the eye. Solutions containing boric acid have caused infection, although no odor was present. Camphor may for a time disguise the odor of a putrid solution.

Eye Diseases.—The suprarenal extract continues to be my most valuable remedy for inflammations of the conjunctiva and cornea. I also find it useful in inflammations of the iris, choroid, retina and optic nerve. Dr. H. L. Lake discovered that it relieved spasm of the ciliary muscle.

The extract accomplishes what no other drug has done in controlling or preventing hemorrhage after operations on the eye muscles and lachrymal sac. Bloodless operations have been performed when the parts were blanched white, not only on the eye, but also on the nose, larynx, middle ear, urethra and skin. Secondary hemorrhage is lessened but not prevented. The value of the extract in acute and chronic inflammation of the mucous membrane of the eye has long ago suggested its use in the treatment of the mucous membranes of the nose, throat, ear and urethra, with good results. The experience of

eye and ear surgeons, and that of others who have the opportunity to study its value, is constantly adding to our knowledge of its properties and widening the circle of its therapeutical application.

In eye surgery when cocaine anesthesia is desired the suprarenal extract is a valuable adjuvant. If, before using cocaine, the blood vessels of the conjunctiva of the eye are contracted by the extract, anesthesia is produced quicker, it is more profound and requires a smaller amount of cocaine. Operations which usually require ether anesthesia have been done painlessly with suprarenal and cocaine. Should a return of the former blood supply be anticipated, a continuous contraction of the blood vessels may be readily obtained by repeated instillations of the extract. In nasal operations, and in operations elsewhere, these facts have been also observed. In connection with the use of suprarenal in eye operations, an interesting fact was noted: Nervous patients bore the strain well when suprarenal was used, showing few of the symptoms of shock which we expect in these cases. The fact that enough of the extract is absorbed into the general circulation from its instillation into the eye to control the action of the heart may explain this freedom from shock. The suprarenal is a most powerful heart stimulant and has been used with great satisfaction in organic diseases of the heart. In chronic glaucoma the local and internal use of the remedy lessens the congestion and intraocular ceedema. This property of the suprarenal has been employed in the treatment of edema of the glottis with the happiest results.

In one case of hemorrhaage glaucoma, suprarenal gr. v every two hours for two weeks, and then three times daily for three months, seemed to control the intraocular bleeding, and the patient recovered with good vision. Some cases of cerebral hemorrhage may be benefited by suprarenal in the same way. Uterine hemorrhage has been controlled by it. The wonderful results obtained in the treatment of lachrymal stricture and suppuration of the sac have suggested its use in the treatment of urethral stricture and urethritis with success.

Ear Diseases.—The extract is valuable in deafness and tinnitus which is not improved by politzeration or other well-known methods of treatment. I have been astonished at the prompt and wonderful results obtained in some cases. The remedy improves the hearing in cases in which air conduction for the Hartmann series of forks is better than bone conduction, as well as when bone conduction is better than air conduction. The upper tone limit is increased. The hearing in chronic cases is benefited to a less extent than the acute. The method of administration is important. My best results were obtained by syringing five minims of a freshly prepared solution through the punctum down the nasal duct and into the naso-pharynx. I use a glass pipette, with a fine tip, for this purpose. This new and original method was published by me in the *Medical News,* January 20, 1894. It may be applied in other ways.

If, now, one examines the orifice of the eustachian tube with a laryngoscopic mirror, it will usually be found whitened and contracted. The hearing or tinnitus should be improved at once. If not, further treatment with the suprarenal will be of doubtful value. The extract is syringed down the nasal duct until the hearing is no longer improved. In one case the hearing was improved from the watch on contact to watch thirty inches, after six applications. As soon as suprarenal has produced its maximum effect, nitrate of silver, ten grains to one ounce, is applied to the eustachian tube and its vicinity by cotton on a probe. The temporary effect of the extract is made more permanent by the action of the nitrate of silver. Dr. J. Clarence Sharp applies the suprarenal solution to the middle ear with the eustachian catheter; the extract opens the tube, drainage is established and the hearing is improved. The best results were obtained in acute occlusion of the eustachian tube from congestion of its lining mucous membrane. In one case, a physician, the hearing was so impaired that ordinary conversation was not heard. Ten minutes after treatment with the suprarenal solution the hearing became normal and the patient was enabled to attend to his practice.

The value of the extract is well illustrated in the following case: A man, aged fifty-nine, was deaf in his right ear, with a very annoying tinnitus, which he described as resembling the terrible din that a locomotive makes in blowing off steam. The left ear had been deaf ten years with tinnitus. He was unable to hear one of the Hartmann series of tuning forks either by air or bone conduction in either ear. Loud conversation was not heard. The suprarenal was applied to the orifice of the eustachian tube frequently for fifteen minutes, with improvement after each application until the noise stopped completely for the first time in his life. The patient was delighted. He was now also able to hear all the tuning forks and loud conversation.

The extract has been used as a hemostatic in ear surgery. Dr. G. M. Black has removed the membrana and ossicles, under cocaine, without any bleeding whatever, by first blanching the tissues with the extract. Dr. Wendell C. Phillips has reported its use in cases operated under ether when the small amount of bleeding was remarkable. I have used it in suppuration of the ear to blanch and contract granulation tissue. It is a valuable adjuvant to the antiseptic treatment.

Diseases of the Nose and Throat.—As a hemostatic, I know of no remedy so powerful as the suprarenal. It has promptly controlled nasal hemorrhage in "bleeders" after sulphate of iron and tampons had failed. In some cases I have had to syringe forcibly the solution against the blood stream pouring from the nose in order to reach the bleeding surface and blanch it. A freshly prepared emulsion is efficient. The internal administration has also controlled nasal hemorrhage, but it is an uncertain method.

Operations on the nose, tonsils and larynx have been done bloodlessly with the use of the extract locally. Secondary hemorrhage is not prevented. I believe it occurs less frequently than when the extract is not used. Surgical shock is lessened, and the nervous dread of an operation has disappeared after the use of suprarenal. All forms of congestion or inflammation of the nose and throat are benefited tempo-

rarily by it. Dr. H. H. Curtis has found the local use successful in relieving painful swallowing in tubercular laryngitis. One case was unable to swallow liquids without suffering agonizing pain. Immediately after the application of the extract the redness and swelling was relieved and the patient was able to swallow solid food without discomfort.

Nasal Hydrorrhea.—Dr. Bernard Berens* reported a case relieved by the local and internal use of the suprarenal. The discharge ceased entirely after the third dose of five grains of the dried gland. Drs. C. P. Linhart and Wendell C. Phillips have also cured this disease with the aid of suprarenal extract.

Hay Fever.—We have no single remedy which can accomplish so much as the extract in the treatment of this disease. The local application to the nasal mucous membrane, and less often the internal administration of the dried gland, has given complete relief to patients who had not been benefited by other treatment. The relief is temporary, and the suprarenal has to be used more or less frequently during each attack. In one case, not benefited by the local use of the extract, the mucous membrane of the nose was pale.

Edema of the Glottis.—In addition to the cases of Cohen, Boeker and McPhee, already reported, I am privileged to report another through the courtesy of Dr. H. H. Curtis: "In May, 1900, I was called to see Dr. T., suffering from acute edema of the larynx. I found the patient much terrified, with very difficult breathing and with the symptom of intense pain shooting to both ears. Laryngoscopic examination showed both arytenoids to be very edematous, the infiltration extending up both folds to the epiglottis. Only a glimpse of the anterior commissure of the chords was possible.' I prepared my tracheotomy outfit, but first proceeded to make a saturated solution of suprarenal capsule in a test tube. By means of a cotton swab wound on a No. 14 galvanized wire which fits the mirror handle, I carried the solution into the larynx and into the pyriform sinus on either side, repeating the operation at the

* N. Y. Medical Journal, September 8, 1900, pp. 434-435.

end of ten minutes. The relief was almost immediate. I left an atomizer with a thirty-grain to the ounce solution for partial inhalation, to be used frequently, and also a ten-grain iodoform and ether spray for inhalation, which I find excellent in these cases. This treatment was carried out for three days, when the patient was advised to go to a mountainous region for complete change of air. I am convinced, as was the doctor, that the suprarenal extract saved a tracheotomy which seemed imperative."

A case was recently treated by Dr. John J. Miller, of St. Louis, which occurred in a man aged eighty, who was suffering with phlegmonous pharyngitis; the patient was apparently choking to death. Five grains of the dried and powdered glands were insufflated into his throat, which gave him immediate relief.

Diphtheria.—Dr. E. L. Kellogg used the suprarenal, both locally and internally, in diphtheria. Its internal administration seemed to diminish the congestion and edema of the throat, while the local application was disappointing. It had no effect on the membrane. Besides the benefit to the throat, the internal administration improved the force and volume of the pulse very promptly. He considers it a valuable heart tonic when that organ is exhausted, and has learned to depend upon it as one of his regular heart stimulants in this disease. He has administered five grains every two hours for several days, and has seen no unpleasant results after its use.

Uterine Hemorrhage.—A case of uterine hemorrhage was reported in which the internal administration of five grains of the dried glands every two hours controlled the profuse bleeding. The cause of the hemorrhage was recently found to be cancer. The wonderful result obtained in this case with the suprarenal has encouraged a number of other physicians to try it, and with success, in promptly checking hemorrhage from the uterus after some other treatment had failed.

Dr. George Tucker Harrison wrote me recently: "In one case of chronic endometritis, in which I had made use of curettage with only partial success, the employment of supra-

renal capsule was attended by the happiest results. One thing I noticed, and that was a marked diminution in the size of the uterus; it seemed to act by stimulating the muscular tissue." I believe Dr. Harrison is the first to observe the diminution in the size of the uterus after the administration of the suprarenal by the stomach. This is to be expected from its physiological properties.

Urethra.—The extract has been used locally to relieve congestion in gonorrhœa. The emulsion, one part of the dried and powdered gland to ten parts of water, freshly prepared, is syringed into the urethra with an ordinary syringe. The patient can prepare and use the emulsion himself. When used just before micturition, pain and tenesmus are prevented, in most cases. Dr. J. A. Moore recommends its use before the passage of a sound. He is able to use larger sounds and prevent hemorrhage and pain. Its use to prevent and control hemorrhage in internal urethrotomy has already been published. Dr. E. L. Kellogg is the first to report its use as a hemostatic in *external* urethrotomy.* The extract was injected with a small aspirating syringe into the tissues about the seat of operation, and checked the bleeding almost immediately. The case was complicated six hours later by a brisk secondary hemorrhage.

Dr. Kellogg also reports: "In two cases of retention of urine, attempts at catheterism previous to the patient's admission to the hospital had resulted in extensive traumatism to the urethral mucous membrane with subsequent swelling and hemorrhage. The injection of suprarenal enabled us to pass filiform bougies, and over them tunneled catheters, although previous attempts had been unsuccessful. These were cases in which we should have ordinarily resorted to suprapubic aspiration."

Heart Disease.—The aqueous extract of the suprarenal capsule is a most powerful heart stimulant. It acts directly on the heart muscle itself. Cleghorn removed the heart from the animal and used that part of the ventricles which has no

*N. Y. Medical Journal, September 15, 1900, p. 480.

ganglia cells. The contractions of the heart muscle were doubled in strength by suprarenal. Oliver and Schäfer obtained more decided effects on the heart with suprarenal than with digitalis or ergot. Clinically, I know of no remedy which is so powerful a heart stimulant. It is active in small doses, five grains of the dried glands producing decided effects, while large doses are not injurious. I wish I could make this fact clear to you all. It is unique. I wish to call your attention to another fact which is unusual—that the extract is efficient in opposite lesions. It is beneficial in aortic or mitral obstruction as well as in insufficiency. Again, the extract relieves the laboring heart with a high tension pulse, as well as increasing the tension of a pulse which is too weak. These facts are explained when we recall that the suprarenal acts on the heart muscle and not on the nervous system. I believe it is an ideal heart stimulant. It is not objectionable in any way.

Dr. S. Florsheim studied the effect of suprarenal on organic heart disease. He is the first to note that a mitral regurgitant murmur may become less or disappear immediately after the internal administration of suprarenal. To him, also, belongs the credit of discovery that a dilated heart may be contracted by the remedy. The effect of the extract is immediate, and is usually temporary. No effect is apparent on the normal heart or on a strong pulse in organic heart disease.*

Dr. P. W. Barber believes he saved the lives of two cases of pneumonia with suprarenal, after other heart stimulants failed. I have seen a patient dying from a complication of heart and kidney lesions, with no pulse at the wrist, who had ceased to be benefited by the usual heart stimulants, revived a few minutes after five grains of suprarenal had been administered; the pulse became strong at the wrist and the patient was able to sit up. For six years I have known the extract to be a valuable heart tonic, and have received reports from physicians who have used it in many conditions, and can assure you that while it has not always benefited the patient, no one has as yet seen any injury from its use. I strongly recommend it to you for further trial.

*New York Medical Journal, October 6, 1900.

Dr. S. S. Cohen, who discovered its value in hay fever, has also been the first to publish the use of suprarenal in *asthma,* with a report of twelve cases benefited.

In *exophthalmic goitre,* five grains of the dried gland, chewed, has relieved the tremor, circulatory disturbances and contracted the enlarged thyroid in five minutes. Should no decided immediate benefit follow the administration of the extract, further dosage is usually followed by disappointment. Hemorrhage from the stomach and bladder has been controlled. It has been used with success in congestion of the liver and kidneys. Some diseases of the skin have been improved by the local use of the extract. (Velich.)

Before concluding, I wish to emphasize one point in the action of the suprarenal, and to draw your attention to another in its preparation, to the neglect of which I have traced every case of failure which has come under my notice:

First.—The local use of the aqueous extract is invariably followed by the characteristic contraction of the vessels in all tissues, but when the drug is administered internally, its action is less constant and the result cannot be accurately predicted.

Second.—The action of the suprarenal follows its administration at once. If it does not take place as expected, remember its incompatibility, and be sure you are using suprarenal whose active principle is unimpaired, and not using an unknown drug resulting from chemical union with a so-called preservative or from decomposition.

After six years' constant use, I feel justified in asserting that whenever a solution of the suprarenal containing its active principle is applied locally, the characteristic action will follow.

DISCUSSION.

Dr. J. A. Stucky, of Lexington, Kentucky.—Mr. President: I desire to add my testimony to the efficacy of this remarkable drug, the suprarenal extract, so accurately described by Dr. Bates. I have met with one or two peculiarities in connection with the use of this drug. I have had two or three patients who claim that it affected them very much like cocaine.

Whether this was imaginary on their part or not, I am unable to say. In some cases I have tried prolonged use of liquid suprarenal with chloretone four or five times a day, applying it for fifteen minutes at a time, and yet it has not caused any sloughing of the membrane. I have found it especially effective in acute eye and throat troubles, diluted one-fourth with some alkaline solution, such as Seiler's. The disagreeable odor so much complained of by some patients is remedied very much by the use of this solution (suprarenal extract combined with chloretone). Theoretically, this may be incompatible, but practically it is a good preparation.

I have been especially pleased with the use of stronger solution made from a desiccated gland in middle ear operations. I have removed parts of the tympanum and the ossicles with the use of cocaine and suprarenal extract without pain practically, and without hemorrhage.

Lastly, the same preparation of suprarenal extract with chloretone has given me the best results of any local application in hay fever and acute inflammatory conditions of nose and pharynx and larynx.

DR. R. A. BATE, of Louisville, Kentucky.—I want to express my appreciation of the paper of Dr. Bates, and in connection therewith I desire to report a case of Addison's disease in which the suprarenal extract was used. The treatment was begun in the clinic of Dr. Stucky four years ago. The patient has been entirely relieved of his symptoms, dizziness, nausea, fainting and pigmentations, and is now hale and hearty.

DR. THOMAS H. STUCKY, of Louisville, Kentucky.—I understood the essayist to say that the suprarenal extract had been known to produce contraction of the enlarged heart. I wish he would give us his idea as to how this marked physiological influence upon the heart is produced, and what the influence is upon arterial tension.

DR. BATES (closing the discussion).—Just a word or two about chloretone. I use the suprarenal extract mostly in affections of the eye. Various substances have been recommended to me for the purpose of preserving the solution, because it is troublesome to make fresh solutions, and among others I tried chloretone. One drop instilled into a patient's eye whitened

it after three minutes. The patient did not like it because of the irritation. A freshly prepared solution whitens the conjunctiva of the eye in forty seconds or less, and for eye work is much better than the chloretone solution. I am pleased, however, to hear that it is valuable in nose work.

In answer to the question of Dr. Stucky as to the action of the suprarenal upon the heart, physiologists have determined to their own satisfaction that the suprarenal is a tonic of muscle tissue. If I had time I could have gone into that more thoroughly. Experiments have been made which show that the suprarenal acts on the muscle itself. When we give suprarenal internally, in heart disease with dilatation, the heart is usually contracted by the action of the suprarenal upon the heart muscle.

In regard to the effect upon the circulation and tension, it is so powerful that 1-100,000 of a grain injected intravenously in a dog will raise the blood pressure higher than any other known remedy will do it.

A man with heart disease and murmurs of all kinds—as mitral obstruction or mitral insufficiency, with low tension pulse, irregular in force and frequency—will be benefited by suprarenal gr. v administered by the mouth and absorbed through its mucous membrane. The pulse becomes regular in frequency and stronger. In other cases with laboring heart and high tension pulse the extract will make the pulse softer. In other words, the pulse becomes as it ought to be, and even if you should give the same patient a dram or a pound of the suprarenal it will not produce any more effect.

I recall a patient with heart trouble. The family physician took hold of the pulse with one hand and held his watch in the other; I injected into that patient five drops of a 1 per cent. solution of suprarenal extract by the mouth. The patient had a pulse with high tension. The heart was laboring under great strain. After this injection the pulse became softer and normal in its action, the heart was relieved, and the attending physician said that this was brought about in twelve seconds. What other drug will produce an effect like that in twelve seconds, when only five drops of a 1 per cent. solution are used?

XXXI.—THE CLINICAL VALUE OF PURGATIVE MINERAL WATERS.

BY EDWIN ROSENTHAL, M. D.

PHILADELPHIA, PA.

During the past summer my attention was called to the use of a new febrifuge known as "thermol," and I had occasion to employ this remedy in various diseases, especially such diseases as those of the stomach and bowels. In the use of thermol for various febrile conditions, I limited myself in the use of drugs and where it was practicable I employed as a purgative any of the various mineral waters with which I was familiar, or with which my patient had had experience. In many instances the employment of such a purge was for no other purpose than to start the treatment, the use of calomel in divided doses being also a common procedure. Studying the effect of thermol as an antipyretic, my attention was called to the effect of these purgative mineral waters in acute febrile conditions, and as my experiences were satisfactory I was prompted to present them in a paper before you.

I might add as a preface to my remarks that in the employment of a water I took as my guide the chemical constituent of that particular water, and in the choice of a purgative I was more often guided by the size of the dose than by the composition of the remedy. Using in my work the many waters met in the apothecary, I should also add that I cannot lay any claim to a preference for one water over another. Therefore if I should mention a water by name I simply do so because this was the water employed in that particular case. Employment of a particular water for a special purpose is always the result of experience, and the experience one has with a particular purgative water can be repeated with another. I therefore feel that in the clinical use of purgative waters any reliable natural water can answer the purpose, if it be for purgative uses only, but for particular action further inves-

tigation should be the rule. I am also firmly persuaded that if as much attention be given to American waters as is given to the foreign waters, the list that I present would have names entirely different, if not as familiar. The geological conditions in the United States are similar to those in Europe; why, then, should not the progressive American physician analyze the waters of our domestic springs and present to us sanitariums and the like for our patients at home?

Mineral water is the name given to those waters on account of the different saline or gaseous substances which they hold in solution, or their elevated temperature, and are used in the treatment of diseases, either internally, or externally in the various forms of baths.

The consideration of the therapeutic value of a mineral water has been left to the specialist, and through his labors it has received the dignity of a name, "balneotherapeutics," and a standing as a method for the treatment of certain diseases. To treat by a course of mineral water requires as much skill and knowledge as is required in any other branch of therapeutics. Advantage derived from such a course to those afflicted with a chronic malady is quite lasting, and the reputation of a mineral water depends as much upon the method of its application as where applied. For instance, the results of a course of treatment at the springs is more gratifying than at home, and frequently gives rise to the question, "Is the water genuine?" The answer is easily made. Patients who go to the springs for a course of treatment not only receive genuine water, and are in that well-known nervous, expectant condition, but also comply more fully with the regulations of such a course, and the change in their mode of living, diet, etc., adds to the advantage thus gained and results more satisfactorily. However, there are many instances where the application of the mineral waters at home is just as efficacious, and in certain acute diseases, where the patient cannot be moved, purgative mineral waters act in the most satisfactory manner. In cases that must remain at home, and in certain conditions of the system where the use of purgative mineral waters is

indicated, a specific water rationally used will act in a satisfactory manner, if the method of its use and the choice of the varieties meet such an indication.

Different mineral waters may be grouped in various ways, as, for instance, their chemical constituents, their temperature, their geological origin or geographical distribution and their physiological or therapeutical action. The chemical classification is best, because it directs attention to the most important constituents of the water, and can therefore be termed the most exact.

Weber (Quain's Dictionary of Medicine) classifies them as follows: (1) Simple thermal waters; (2) common salt or muriated saline waters; (3) alkaline waters; (4) sulphated saline waters; (5) iron or chalybeate waters; (6) sulphur waters; (7) earthy and calcareous waters.

The purgative mineral waters belong to that group of waters known as the sulphated saline waters (6), and are characterized by a preponderating amount of the sulphate of sodium or magnesia, or both sulphates together. They may be divided into (a) simple sulphate waters or bitter waters, and (b) alkaline sulphated waters, which latter contain also carbonate of sodium and chloride of sodium and lithium. These latter ingredients are called "modifiers," and are essentially and distinctively the essence and mark of each specific water, and differentiate them from the natural (which always contain them) and the artificial (where they are often forgotten or left out by the manufacturer).

Mode of Action.—Purgative mineral waters act by stimulating and in larger doses irritating the mucous membrane of the stomach and alimentary canal, causing a thin watery secretion, and in larger doses a diarrhea. The peristaltic action of the intestines is also increased. The sulphate of soda waters, according to Weber, before quoted, are less irritating than the sulphate of magnesia water.

The continued employment of mineral waters is apt to produce emaciation, hence the employment of such waters as a method of treating obesity, has a substantial foundation in fact.

By the presence of the carbonate or chloride of sodium or lithium, or any modifier, the action of the water is modified.

Selection of a Mineral Water.—Where prolonged courses are required the weaker and especially the alkaline sulphated waters are to be preferred, while the stronger bitter waters may be selected for an occasional purge. So many and so various are the bitter waters we meet with that to enumerate them would bring this paper to an undue length. I wish to state briefly that the waters of eastern Europe, and especially of Bohemia and Hungary, are the ones now attracting popular fancy and hence are better known. The changes which take place in the popularity of these waters depend mostly upon the business enterprise of the owners. Take the changes during the last twenty years, in the eighties the Friedrichshaller bitter water was to be had at all apothecaries, and one could get Crab Orchard water or the salt. In the nineties the Hunyadi-Janos, a most meritorious water indeed, and other varieties appeared, and now their room in the druggists' windows have been taken by Apenta; hence the selection of a purgative mineral water depends much upon its popularity rather than upon scientific judgment. A popular opinion also directs the clinical use of these waters. For an example, were I to ask, "What are the virtues of Carlsbad water?" the answer would be given, "Useful in liver diseases," or were I to ask the same of Wildungen, the answer would be "Bright's disease." The method of depending upon the certificates of unknown chemists or clergymen for the character of a water is all wrong, and brings with it much disappointment and loss of faith.

Purgative mineral waters exist in every country, and in the United States, especially in the territory embraced by the Mississippi Valley Medical Association. Those of our associates who reside near, or who are connected with such springs, should present at these meetings their specific waters, and in that way acquaint the profession conspicuously with their existence. In Europe no spring is too insignificant to demand an analysis and a therapeutic trial.

The principal simple sulphated or bitter waters, are Galthof, Pullna, Saidschutz, Seidlitz, Bermensdorf, Ivanda, Hunyadi-Janos, and other springs near Ofen, Epsom, Aranjnez, Friedrichshall and Mergentheltheim. The two latter springs are also rich in chlorides. Weaker springs of a similar nature are at Leamington and Cheltenham. The Tate Epsom spring water in East Tennessee can also be placed with the bitter waters, while the waters from Crab Orchard springs in Kentucky have long and favorably been known for their characteristic qualities.

The principal alkaline sulphated waters are the Carlsbad, Marienbad, Tares, Schulz, Frazensbad, Elster and Bertrich. The constitution and the action of the waters of Carlsbad and Bertrich are modified by their thermal nature.

Many of the purgative waters contain, besides the two principal ingredients, the sulphate of sodium and magnesium, other substances which modify the effects somewhat. These substances, termed by many as modifiers, are seen in small quantities, but sufficient to mark the identity of that especial water, and, in addition, give it specific value. For instance, if lithium be found in sufficient quantities to be operative, the presence is of considerable importance, and directs conspicuously to what class of diseases such waters are specially indicated. It is these so-called "modifiers" that give the mark of the genuineness of a specific water, for in the manufacture of such waters the essential purgative ingredients may be found, but the modifiers are never imitated, thus impairing or destroying the individuality of the especial water. However, in some respects, in the treatment of obesity, for instance, an artificial water will answer the purpose if the chemical analysis of such waters are closely followed, and even if the salts representing the essential ingredients be used, Dr. Cathell (whose experience in the treatment of this class of cases is so well known) finds their action similar.

Method of Taking the Purgative Mineral Waters.—In the use of a purgative water a perfect rule to follow is to imitate the nature of that water as nearly as possible. As an example,

if it is desired to administer Carlsbad water, the water should be heated and then taken on an empty stomach on rising, sipping it only, and not drinking it in large gulps. Patients should be directed to take some exercise until the bowels have been opened. Other purgative waters can be taken in a draught. However, the dosage and the method may be changed to suit the individual case. Methods of taking purgative waters are numerous. I have seen a large tumblerful of Hunyadi-Janos water taken after a banquet in the middle of the night, the patient explaining that by so doing he prevented an attack of biliousness or an eczematous rash from appearing, which was always the case did he fail to follow such procedure. It was plain to be seen that this patient suffered from a gouty condition and knew his remedy. Others who suffered from habitual constipation would swallow their dose the first moment on awakening, without regard to the nature of the water.

In my work the past summer I had occasion to use the simple bitter waters in a number of puerperal cases. In one suffering from "weid" the patient could only drink the water ice cold, while in another case suffering from septicemia the patient could only retain it if given warm. If the water be taken as a course of treatment, as, for instance, in obesity, the method pursued should be as near as possible to that pursued at the spring. The time, dose and temperature are as necessary to follow as is the diet, exercise, etc., and to do so will repay with a satisfactory result, while to neglect will give disappointment.

It is in pregnancy that my experience is most numerous and gratifying. I direct in all cases that a purgative mineral water be taken in suitable doses, on an empty stomach, every morning, beginning at the seventh month, and so continued until after the lying-in period. I have used the various simple bitter waters in this condition, and, having a perfect familiarity with all those found in the apothecaries (the Friedrichshall bitter water, the Hunyadi-Janos bitter water, etc.) I have no hesitancy in saying that any can be used in pregnancy with the same result.

While by the name purgative we mean the act of cleansing, or purifying, or carrying off impurities by the bowels, we denote the action desired by such terms as a laxative (a gentle purge), a cholagogue (a bile expeller), a hydragogue (a water expeller), etc. We call such remedies by the name cathartic, and often speak of a saline purge, or a simple purge, etc. Now in the use of a purgative mineral water we can combine any of these effects, and in the clinical use of the water the size of the dose is alone sufficient to give the effect desired.

I make a plea for the study of the purgative mineral springs of this country, for, to get results, we need such remedies the original nature of which should be unquestioned. If, as in mineral waters, we desire to use the genuine article, we have at present little guarantee to assure us that it is not manufactured; so, for this reason alone, only those waters should be employed the names of which are above suspicion.

Clinical Uses.—Mineral waters have been almost limited to chronic ailments. Their remedial action, however, is applicable to acute as well as chronic conditions. As a simple purge in constipation it stands as an empirical remedy. But even in these conditions a choice of the various waters is indicated.

A simple bitter water can be used in those cases of constipation due to habit, in those cases with a sluggish circulation and a tendency to hemorrhoids; in plethoric conditions complicated by sleepiness, headaches, backaches, disordered circulation from ptomaine poisoning, whether there be constipation or not.

I have used these waters in congested conditions of the pelvic viscera, as well as organic diseases of the same, carcinoma of the uterus, bladder or bowels; in inflammatory conditions, as endo- or peri-metritis, as well as inflammation of the tubes or ovaries, and even where there is pus a simple bitter water acts satisfactorily; indeed, in the latter cases, in which an operation has been performed, the exhibition of a purgative water before or after the operation is always of use. When a section is made, and the time is ripe for the purgative medicine, a simple bitter water, diluted with warm water,

relieves the intense thirst, and at the same time acts in a very satisfactory manner.

The simple bitter waters can be used empirically in pregnancy, and should be used as before mentioned. In diseases of the puerperium, or in any condition of the lying-in, where a purge is needed, the water can be given, the size of the dose being sufficient to answer any indication. I always administer the water as an opening purge, generally on the third day, in place of the old-fashioned castor oil or citrate of magnesia; and, where in diseased conditions a purge is required, I have used these waters even in the most grave affections. I append two charts, which are self-explanatory and will show briefly the method of its use.

Case 1.—Mrs. B. suffered from "weid" on the fifth day after child-birth. On the third day the opening purge of the water had been given; when on the fifth day the fever set in thermol was administered and the purgative water in suitable doses every two hours until a diarrheal effect was obtained.

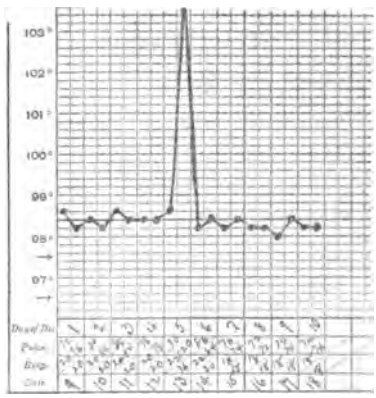

CHART 1.

The same effect was desired in Case 2, Mrs. B. A., multipara. She was confined by a midwife and was in a fair condition for several days. The beginning of her septic symptoms were mostly gastric, considerable nausea, and some vomiting. Calomel in divided dose was rejected, citrate of magnesia, as well as Epsom salts and the like. I had performed curettage very gently once, and the second time Dr. W. N.

Wells operated in as equally gentle way. Anti-streptococcic serum was administered hypodermatically in 20 C. C. doses every twelve hours. All symptoms were indicative of a fatal termination. A purgative was imperative, and recourse was

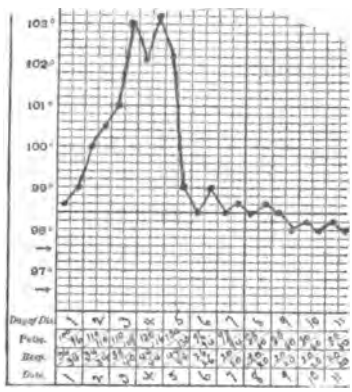

CHART II.

had to a simple bitter water, heated by the addition of boiled water. My nurse had had experience with such waters in section cases, hence she took a wine-glass full of the water to the tumblerful and gave it in a slow manner by teaspoonful doses. Under this method the nausea ceased, and the bowels were moved, and after this all the medicine, food, etc., were retained. In this case thermol was also given for a few days, and after the fever had disappeared no other treatment but a daily exhibition of the water. I do not wish to say that the bitter water was the cure for this grave affection, but I do wish to say that, as a purgative, this class of waters is eminently satisfactory.

The other acute condition in which I have used the water was in the operation for dysmenorrhea, dilatation and curettage; in this case the water was simply used to meet the indication—a purge.

Chart 3.—Mrs. N. suffered from endometritis, dilatation with curettage. As seen by the chart, a slight elevation of the temperature was always noted, and to meet this condition a

purge of bitter water was daily given, douche twice daily, and the thermol when indicated.

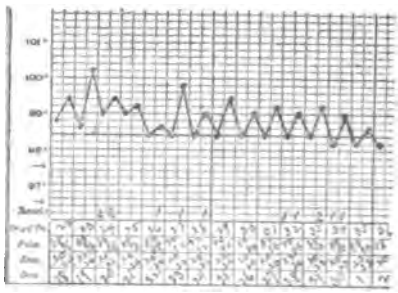

CHART III.

Case 4.—Pauline U., age eight years. In this family were two cases of typhoid fever, and this child was exposed to the same causes, hence was watched by the nurse attending the other cases. The treatment was a suitable dose of bitter water as an opening purge for beginning treatment, and thermol in divided doses. As the fever disappeared (note the Chart No. 4) the medicine was reduced, as was the purgative, and even into convalescence the bitter water was given if indicated. As thus seen, the simple bitter waters can be used in a variety of conditions, and as a purgative it is both certain and innocent.

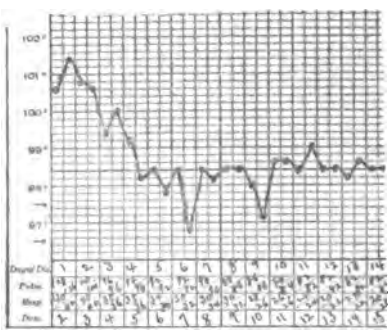

CHART IV.

The Alkaline Sulphated Waters.—In the rational treatment of diseases the practitioner should always know the weapons he uses. In the use of purgative mineral waters this truth is truly exemplified. Habit is too strong with the general practitioner to change his method of medication. It is a rule of

practice to always begin the treatment of disease by the use of a purge, and calomel appears to be the drug that stands first. When, however, treatment is begun, the object of which is the daily exhibition of a purge, some discernment should be practiced. While the simple bitter waters act simply as a purge, the alkaline sulphated waters have, by reason of the additional ingredients known as the "modifier," a selective or specific action. For this reason it is well to know what this modifier really is. If it should be a salt of lithia, the water is especially indicated in those conditions of the system in which urea predominates and which we designate as gout or gouty diathesis. I have treated such cases as neurasthenia, gastrodynia, etc., due to the presence of urea, with those waters if a purge is indicated or a course of treatment required it. Diseases of the liver, jaundice, gallstones, conditions in which there is an enlargement of the liver and spleen, and where the bile is thickened, etc., the course of an alkaline sulphated water gives greater promise of relief. Diabetes, with all its complicating sequelæ, is always benefited. As an example of this class of cases I cite the following:

Mr. C., aged 65 years, an Irishman by birth; is a milkman. This requires him to sleep more at day than at night. In early life he was a sailor, and after leaving the sea, followed laboring work, a stevedore, for ten years. Mr. C. suffered from diabetes, to his own knowledge, two years before he came under my care. He has been treated by me nearly three years. The most prominent symptom is gangrene of the toes. One after another of the toes became affected and dropped off. At this moment he has gangrene of the large toe of the right foot and the second toe of the left foot. All the remainder of the toes of the right foot are gone; only the second phalanx of the middle toe of his left foot is lost. He passes large quantities of urine and presents other symptoms, as constipation, cough, thirst, etc. The treatment consisted of diet restricted only partially, for a drink, large quantities of buttermilk; medicine, a pill, as follows: Chloride of gold, sodium, 0.003; lithium benzoate, 0.06; ammonium salicylate, 0.15; codeine, 0.008; take three to six daily, and each morning Carlsbad water, heated and slowly sipped. The pills have been taken continuously, but the water, on account

of the taste as well as the cost, was sometimes stopped and other purgatives substituted. This, however, was never so satisfactory, and so the water was again continued, but only when needed.

This case is given as an example of the many waters that one can use in practice, and how a specific water for a specific purpose can be obtained and a treatment pursued without recourse to the spring. I might add that a substitution to a simple bitter water was also tried, but the result was unsatisfactory. Examples like this one should be sufficient to prove the variety of mineral waters is numerous, and their application is equally as numerous, and that there is a great difference in the simple bitter waters and the alkaline, and that the action of the latter is more of a specific character.

In the treatment of obesity by the use of mineral waters, as recommended by Dr. Cathell, the alternating of Vichy with the Kissingen water, the use of the alkaline sulphated waters are of advantage, and are of far greater value than the simple bitter waters. Not only are cases treated in this way benefited, but where the thyroid extract is used the action of the extract is made more prompt, nor are there any evil effects, as headache and the like, as noted when the extract is used alone. If objection is made to the multiplicity of waters in the treatment of the obese, the water alone is often sufficient when used with a restricted diet, etc.

At present rheumatism is treated by a course of water in which the lithium salt predominates. If, when treating such cases, a purge is required, the use of the alkaline sulphated waters is indicated and their action is truly specific if the lithium salt be the specific modifier.

To summarize: Purgative mineral waters are divided into two kinds; first, the simple sulphated or bitter waters; can be used as a simple purge; indicated in habitual constipation, hemorrhoids, ptomaine poisoning, infection from the alimentary canal, a purgative in organic diseases of the bowels or pelvic viscera, in inflammatory conditions of the same, in certain febrile conditions when a purgative is indicated; always useful in pregnancy, to be used during that period up to and after

the puerperium. Second, the alkaline sulphated water can be used also as a purge, but has a specific selective action used in blood diathesis, as lithiasis, rheumatism, gout, obesity, diabetes, etc., can be used in organic diseases of the liver, spleen and bowels, and as a course of treatment the alkaline sulphated waters are to be preferred.

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XXXII.—ERICHSEN'S DISEASE—DOES IT EXIST? VARIOUS INJURIES DUE TO ACCIDENT.

BY ISHAM H. GOSS, M. D.

ATHENS, GEORGIA.

If any one subject has engaged the attention of railway surgeons to the exclusion of all others it is that of injuries of the spine, and especially that class of injuries which are due to indirect violence. In those cases where the injury has been applied directly to nervous tissue, the results are so immediate and in such perfect accord with our present knowledge of the finer anatomy of the cerebro-spinal axis that any discussion of their nature would be out of place. Our attention is rather to be directed to that questionable group of spinal injuries in which

it is claimed that concussion of the cord has taken place without any fracture, dislocation or other gross lesion being found in the spinal column.

It is proverbial that the laity are fond of a name, and this remark applies with striking force to the malingerer. Erichsen, in writing his lectures in 1866, supplied a long-felt want and from that time until the present day the records of our courts are replete with damage suits for "concussion of the spine," "railway spine," "Erichsen spine," "concussion from indirect violence," and so on *ad nauseam*. It is rather a significant fact that prior to writing his paper Erichsen was disappointed in his application for the position of railway surgeon to one of the large English corporations. Admitting that his intentions were the best it is nevertheless only too painfully evident from his writings that he was unconsciously biased by his personal rebuff. This supposition gains additional color from the fact that Erichsen himself admitted in his later writings that the conclusions reached in his earlier studies were erroneous.

His acknowledged position, his surgical attainments and great rhetorical gifts made his paper authoritative in his day, and it has been only in the last decade, when his work was reviewed by the strong light of modern pathology that the tangled mesh of insinuating and often misleading statements could be unraveled and seen in its true light. Had he been the best neurologist of his time he would still have been ignorant of the histologic structure of the cord, ignorant of its systemic degenerations, ignorant of everything in spinal pathology except a few facts about locomotor ataxia. He never examined the reflexes, rarely mentions anesthesia, and was, in common with all men of his time, necessarily deficient in a comprehensive knowledge of nervous symptomatology. To quote from Pearce Bailey: "Erichsen's theory of concussion of the spinal cord as a pathological entity was purely hypothetical. Microscopical technique is more advanced now than it was at the time he wrote, yet it has thus far failed to disclose not only molecular pathology, but any such thing

as molecular structure. Molecular disorders are still in the domain of speculative science. The significance of local spinal anæmia and hyperæmia, to which he ascribed much importance, is absolutely unknown. It is not intended to cast any discredit upon Erichsen or his work, but, writing at the time he did, it would have been impossible for him to formulate a theory which could serve as an authority to-day." It is not surprising, then, to find that his lectures throughout are vague and indefinite, cause and effect being constantly confounded and his deductions, although clothed in the seductive language of the master, absolutely without value.

Erichsen opens his lectures with a misleading analogy between the brain and spinal cord. Their anatomic relations absolutely exclude any such comparison. Let us consider for a moment upon what a feeble basis this analogy rests. The brain practically fills the cranial cavity, no great distance separating it from its containing wall; the bones are subcutaneous, so that any force applied to the scalp necessarily acts directly upon them. The spinal cord, on the other hand, is suspended in a capacious canal by its membranes and by the nerve trunks passing out through the intervertebral foramina, and so surrounded by cerebro-spinal fluid that considerable space exists between the cord and the vertebral column. Nature has still further protected this portion of the nervous system by surrounding its bony case with a thick muscular pad —the extensor mass—which makes injury to the nervous tissue without demonstrable lesion of its bony canal well-nigh impossible. Sir Frederick Treves aptly remarks: "It is difficult to understand, therefore, how a structure so protected can be so violently disturbed by a shock received upon the body as to undergo a grave and progressive loss of function. The cord is, indeed, somewhat in the position of a caterpillar suspended by a thread in a phial of water. It would probably be difficult to permanently disturb the internal economy of such an insect (even if it had a structure as elaborate as the cord) by other than violence that would be comparatively excessive."

Modern pathology has taught us, moreover, that concussion of the brain, the tumefaction of the elder Gross, is an expression without meaning; there is always some laceration of the cerebral tissue which will account for the symptoms. With our present methods of refined diagnosis and our accurate knowledge of the course of the great nervous tracts, this injury can be definitely located—it is immediate and organic in its character. It will thus be seen that the so-called concussion of the cord is a surgical chimera, the existence of which is doubted by all. Erichsen's expression, "concussion of the spine," is still more misleading. As is very properly remarked in Holme's Surgery, we do not speak of concussion of the cranium, yet this portion of our bony anatomy is much more exposed to the effects of violence.

A brief review of some of Erichsen's cases will at once demonstrate the inaccuracy and vagueness of his ideas. Many of them are examples of severe injuries to the cerebro-spinal axis—cases which to-day would fall under the commonplace headings of meningitis, spinal hemorrhage and fracture and dislocation of the vertebræ, with well-marked and characteristic clinical symptoms and signs. A very small proportion can be interpreted as being due to functional disturbance of the entire nervous system. From his own description it is frequently difficult to determine the exact nature of the patient's ailment. Of his series of fifty-three cases, only seventeen were injured on the railway. Case six is undoubtedly an example of hysterical paraplegia; cases fourteen, fifteen and sixteen proved to be unsuspected fractures and dislocations; cases seventeen to twenty-four are imperfectly reported; case forty-three exhibited no spinal symptoms except those of syphilis, the patient making a good recovery upon iodides. In case forty-eight he absolutely fails to distinguish between symptoms of cerebral and spinal origin, attributing a facial palsy to an injury of the cord. His one solitary autopsy which he uses as a pathologic basis for his so-called "spinal concussion," was surely a case of locomotor ataxia. Space forbids a further or detailed analysis of the en-

tire collection. It is, however, unnecessary—a chain is only as strong as its weakest link!

Erichsen believed that an individual who had received a severe shaking-up could subsequently pass through a latent period of months, exhibiting no symptoms whatever, and then gradually evolve a long chain of disturbances ending in permanent disability and serious impairment of the entire nervous system. It is sufficient to say that pathologic evidence for such a case has never been demonstrated upon the autopsy table. It is striking that with our improved pathologic technic, and considering the intense interest which this question has excited, not a single post-mortem has been recorded which could establish the possibility of concussion of the cord by indirect violence, without most serious and demonstrable concomitant lesions. If such evidence existed it would be heralded in public places, only too loudly, by anti-corporation lawyers and physicians. As a matter of fact, these cases, instead of languishing away, almost invariably recover when a substantial amount of damages has been awarded to them. Extreme illustrations may be found in an article by Hodge in the April number of the *Boston Medical and Surgical Journal* of 1881. In one case the plaintiff celebrated his $10,000 verdict "by becoming uproariously drunk, and it required the united strength of three policemen to take him to the station house." This individual subsequently followed the arduous calling of a junk dealer for many years. A second case is quoted in which there was a claim of impotency resulting from the injury, and the jury expressed their sympathy by a verdict of $18,000, yet somewhat more than nine months afterward the man was convicted of bastardy.

The credit of exposing the fallacy of Erichsen's teaching must without question be given to Page. Writing, as he did, seventeen years after the appearance of Erichsen's lectures, he had the benefit of more advanced research and could consequently examine his cases more critically than could his distinguished predecessor. His position as railway surgeon to the London and Northwestern Railway of England made his

opinion of particular value. No one who reads his work can escape the conviction that he treated his subject with absolute fairness and impartiality. In the appendix of his book he tabulated the results of two hundred and thirty-four cases, which he had kept under observation for periods varying from two to five years after the accident. His conclusions were that although a return to the normal may occasionally be much delayed, most cases completely recover.

In the next few years the majority of these cases were usually explained as resting upon an hysterical basis. Putnam reported a case of hysterical hemianesthesia and paraplegia following an accident, and dwelt strongly upon the presence of hysteria in these conditions of concussion. Walton tried to clear up matters by proposing to substitute the expression "railway brain" for that of "railway spine." In 1884 Dana published a complete *resume* of these injuries, in which he came to the conclusion that "concussion is mental shock and physical bruising." Thomsen and Oppenheim in 1885, attempted to prove the existence of an organic basis for many of the traumatic affections under discussion, but their efforts in no way weakened the theory of the hysterical character of these disorders. The "general traumatic neurosis" described by Strumpell, in 1888, was a mixture of hysteria and neurasthenia. The same can be said of Oppenheim's description of the traumatic neurosis which he embodied in his monograph appearing in 1889. His work was entirely clinical, and he did not describe any direct lesions of the nervous system. In the same year Clevenger, of Chicago, published a book on "Spinal Concussion," in which he endeavored to corral these varying disorders under the title of "Erichsen's Disease." This name certainly has not met with the approval of those most able to form intelligent conclusions. The best criticism of Clavenger's book is that of Giles de la Tourette, who designates it as "the triumph of confusion of ideas upon the subject."

Such, in brief, is the history of the subject under discussion. While admitting the occasional possibility of obscure

symptoms being due to minute hemorrhages, the majority of this class of injuries will be found to be cases of hysteria, neuromimesis or malingering. At the present day no one could well attribute spinal symptoms to a previous accident in which there had been an intervening latent period of perfect health for several months.

A word as to the examination of these cases. The testimony of the surgeon is frequently directly opposed to that of the neurologist. It is doubtless due to the different class of cases seen by the two individuals. Both are honest in the expression of their views, but as long as our present system obtains greater weight must be given to the opinion of the surgeon. Of what value is the testimony of the neurologist when he sees the individual, for the first time, months after the reception of the injury? Is it fair that evidence like this should offset the opinion of men who see these cases immediately after the accident? Is it not true that the surgeon will see hundreds of cases that are settled outside of court and with which the neurologist never comes in contact? The neurologist is more familiar with the terminal stages of hopeless disease which waste away in the hospital; the surgeon, on the contrary, sees not only examples of severe organic injury, but also those cases in which functional disability is claimed, and in which he must be constantly on his guard, endeavoring on the one hand to do justice to the individual, on the other to see that a corporation is not mulcted by the unscrupulous malingerer.

It has been well said that "no electric test has yet been found which is not rather a test of the credulity of him who trusts it." An unexpected hair-pull will frequently reveal more than the electric battery or the esthesiometer. In concluding this portion of my subject I cannot do better than to quote from Page, who says: "Nothing has struck me as more extraordinary in my experience of railway injuries than that in the examination of them all common sense—the best and surest diagnostic guide—should be so often abandoned, and reliance placed rather on methods of examination which are

of scientific value only, when every suspicion of exaggeration or imposture can be put away."

The juror is also frequently confused by the claim of the plaintiff that certain nervous diseases are due to injury. The commoner ones in this category are locomotor ataxia, spastic paraplegia, amyotrophic lateral sclerosis, progressive muscular atrophy, and paralysis agitans. As far as the scleroses of the cord are concerned, the entire group are so insidious in their onset that a searching anamnesis will usually reveal indubitable evidence of the existence of the disease before the reception of the injury. According to Fairchild, those injuries which involve hemorrhage, contusion or laceration may sometimes be regarded as etiologic factors in the production of these diseases, but the neurasthenic and hysterical cases do not, in his judgment, result in this manner. In one hundred cases, fifty of which were the subject of litigation in the past fifteen years, he did not find one such instance, despite the fact that he had observed many of them for years subsequently. In reference to these cases Clevenger makes a most practical suggestion. These are his words: "The surest method for the unmasking of a malingerer consists in having him represent some definite type of disease. Let him choose at pleasure from the variety which the medical books offer, but when he has chosen let him stick to it. To carry out the fraud in the presence of a physician who is more familiar than he with the particular type of disease represented is well-nigh impossible."

Internal Injuries.—An individual will frequently excite great sympathy in the mind of a jury by claiming that his vital functions have been most seriously impaired by an injury to the chest. Pointing to a wound over the heart, he will tell in a dramatic whisper that he has coughed up quantities of blood, or dilate upon the symptoms of his supposed emphysema, empyema, pulmonary abscess, or pneumothorax. A little reflection will convince any one that all of these affections can only have their origin and inception in a fractured rib. Now, if there is one thing the modern surgeon can do it

is to diagnosticate a fracture. Five years ago a fleshy individual could challenge the most skilled diagnostician to say positively that a costal fracture did not exist. The Roentgen ray has made such a possibility a thing of the past. Although the millstone retains its old-time opacity, even blind justice can see through several inches of fat and muscle and detect a normal rib.

Hernia.—We sometimes hear that a hernia has been due to an accidental injury. A reference to any of the large and carefully collected statistics will show the rarity of such a possibility. Some authorities claim that one person out of every eight suffers from this affection. If a single traumatism played any role in its development, the importance of accidental injury would most certainly be emphasized by surgical experts. Even if a rupture were due to a traumatism, we must admit the previous existence of a congenital sac or other developmental errors, for which a corporation could not be held responsible. If, in addition to these errors, the individual favors an elongation of the mesentery by alcoholic excess or indulges in violent intermittent physical exertion, he alone should suffer the penalty. The classic symptoms of hernia are so well marked, and the signs of a recent descent of the bowel are so distinctive, that any careful man will have no difficulty in throwing out the unjust claim of the ignorant or unscrupulous.

Floating Kidney.—The observations made in reference to hernia will apply with equal force to floating kidney. A few authorities mention trauma as an etiologic factor, but in all of these cases the traumatism is small and frequently repeated. According to Lindner, Drummond and others, this displacement is always due to a congenitally relaxed condition of the peritoneal attachment of the organ. Its preponderance in women and upon the right side point so clearly to anatomic and physiologic predisposition that theoretically a single injury is unable to produce it. The renal artery and vein certainly cannot be lengthened in a moment. A careful search through the literature failed to discover a single example of

such an occurrence. It is such an easy matter to photograph the kidney by means of the X-rays that its normal situation can be readily established even in the corpulent.

Bones and Joints.—Injuries to these structures have always been a fertile source of damage suits. A feigned inability to use a limb may readily be detected by comparing its circumference at various levels with corresponding measurements of the opposite side. If the patient has been using the extremity when unobserved, atrophy of disuse—a constant sign of actual disablement—will have failed to make its appearance. Until the advent of the X-rays we were frequently in the dark as to the possibility of the existence of deep-seated fracture and dislocations. Our information is now so exact that we can tell to a nicety the exact relations of osseous and ligamentous structures. Torn ligaments, displaced cartilages, floating bodies, congenital malformations and ruptured viscera are exposed to our view with an exactness of detail that almost approaches that of a careful dissection of the parts.

In concluding my paper I would emphasize the fact that injuries due to railroad accidents are followed by the same signs and symptoms that characterize other violent traumatisms. It has been estimated that $25,000,000 are annually paid to injured railroad employees alone in the United States and England. The greater portion of this money goes to individuals who base their claims more upon the natural antipathy of the average juryman for a corporation than upon any actual physical injury. The railroad has its side of the question as well as the individual. It certainly can demand most accurate information as to the nature of the affection for which it is paying. There should be no such diagnosis made as "obsure internal injuries," and any claim based upon such a diagnosis should certainly be viewed with suspicion. If an individual has been injured sufficiently to put in a claim for damages, he has been injured severely enough to present symptoms and signs that can readily be recognized by our present methods of diagnosis.

XXXIII.—WHAT THE LAW REQUIRES OF THE SURGEON.

BY DUDLEY S. REYNOLDS, A. M., M. D.

LOUISVILLE, KY.

Before entering into a consideration of the details of my subject I think it well to have an understanding of the meaning of the title "surgeon." In Great Britain "a surgeon is a person whose education is equal to that of a bachelor of science in a university and whose professional qualifications are such as to enable him to undertake the treatment of diseases and injuries by manipulations with the hands, by external appliances, or by the use of instruments." He need not be a graduate of medicine, but must have successfully passed the examinations prescribed by the Royal College of Surgeons. In the United States we have but one class of medical men; they are all doctors of medicine, which must include a knowledge of surgery, and are known as physicians.

The law, however, does not hold any practitioner responsible for failure to undertake any particular branch of practice; but it does require that, in every field in which he undertakes to practice he shall exhibit a reasonable knowledge of the science of that branch of the profession, and that he shall exhibit in his practice a reasonable or average degree of skill for that vicinity, and that he must be duly vigilant in his attentions to the patient.

The common law does not recognize special systems of medicine. In the case of Nelson vs. Harrington (Wisconsin), 40 N. W. 228; Amer. Digest, 1888, p. 855, the practitioner was a clairvoyant. It was held that "the trial court erred in instructing the jury that the defendant must have exhibited the ordinary skill and knowledge of the clairvoyant system." The instructions should have been "with the ordinary skill and knowledge of physicians in good standing in that vicinity."

Evidence that the defendant, in an action for malpractice, procured his license by diploma irregularly obtained, or by evading the required examinations of the State board, cannot

be introduced against the defendant. Bute *vs.* Potts, 18 Cal., p. 329.

Thus it would appear the sole test is to be found in a determination of the question as to reasonable familiarity with the science of the profession, ordinary skill in the practice, and due diligence and care in attention to the patient. The fact that the plaintiff accepted the services of the defendant, believing him to be of good reputation as a practitioner, is not, however, to be accepted as evidence that the defendant possesses the legal qualifications to practice his profession.

If the action is for the recovery of a fee, the physician must prove his legal qualifications to practice. If, however, the action is against a practitioner, and the charge is lack of legal qualifications, the burden of proof rests with the plaintiff to show that the practitioner is not legally qualified.

It was held in the case of Hess vs. Lowry (Indiana), 23 N. E. 56; Amer. Digest, 1890, p. 2406, that it was competent for the plaintiff to show, as affecting knowledge and skill, that the defendant was engaged largely in pursuits other than the practice of his profession.

The application of this principle must have great weight in many cases, for it must be remembered that in every instance the jury is the sole judge of the sufficiency of the evidence to establish the possession of the legal requirements of a practitioner; and it should be remembered also that the jury must fix the amount of damages to be assessed for negligence and lack of knowledge or skill.

To show how far the question of negligence may extend in an action for damages, it was held, in Beck vs. German Klinik (Iowa), 43 N. W., p. 617, that failure to properly instruct the patient as to the management of his broken leg after the removal of the dressing, the leg afterward having become bent and finally requiring amputation, rendered the defendant liable. The plaintiff was ignorant of the limitations to which, as the court held, a surgeon should have instructed him that his condition required in the use of the leg. There was no question of skill in the adjustment of the fractured bones or

of the subsequent treatment up to the time of removing the dressing.

Contributory negligence on the part of the plaintiff, rendering two amputations necessary, in consequence of the plaintiff's failure to obey instructions, may be considered in assessing the amount of damage, but would not bar recovery for injury resulting proximately from the defendant's negligence. See Du Bois vs. Decker, 4 N. Y. S., p. 768.

If the patient dies on the table from the effects of an operation done by consent, in a careful and skillful manner, the surgeon believing it to be proper and necessary, the plaintiff cannot recover. State vs. Housekeeper, Maryland, A. 16, p. 382.

If a practitioner makes affidavit that a person is insane, for the purpose of securing commitment to an asylum, without first making due inquiry into the sanity of the patient before certifying, he is liable for negligence. It is required in every instance that a thorough and painstaking examination, intelligently conducted, shall form the basis of all such certificates. See Ayres vs. Russell, 3 N. Y. S., p. 338.

In determining the competency of a surgeon to practice his profession, evidence of his general reputation for skill and ability is alone relevant. It must be proved by persons knowing such reputation in the community where the defendant is engaged in practice. Lacy vs. Kossuth County, 75 N. W., Amer. Digest, 1898, p. 4998.

The measure of damages to be assessed in cases of malpractice will, in most States, be divided into compensatory damages and punitive, or retaliatory, damages. Thus, the amount of damage sustained by the plaintiff may alone be assessed against a practitioner whose ignorance or lack of professional skill may be established by evidence. Where gross negligence is established, punitive, or retaliatory, damages may be obtained in most of the States.

"Sedgewick on Damages," Vol. 1, page 51, says: "It may be laid down as a general rule that an injury to any right protected by law will, if the direct consequence of an actionable wrong, be a subject for compensation."

In enumerating some of the grounds of action at law, physical pain, mental distress and bodily discomfort are mentioned. The surgeon is in an unfortunate position when made a party defendant in an action for damages for physical pain and mental distress, the pecuniary equivalent of which is to be measured entirely by a jury of laymen.

The ethics of the medical profession has frequently been recognized in courts of law. In the case of Bremerman vs. Hayes, 9 Pa. S. C., 8; Amer. Digest, 1899, p. 463, it was held that evidence that the ethics of the medical profession forbade physicians charging for services to each other, and that it was the custom in particular localities not to charge for such service, was admissible to negative an implied promise of one physician to pay for the services rendered by another.

There are many other instances which might be cited to show the importance of observing the *Code of Ethics* as affecting the character of individual members of the profession. It has frequently been held that a surgeon who does not observe the ethics of his profession is not a man of good standing in the profession, and it may be inferred that such an individual would, in many ordinary situations, be practically without means of defense in a court of law. In the case of Lange vs. Kearney, 4 N. Y. S., p. 14, it was held that "the surgeon may prove his high standing in the profession as bearing on the value of his services."

Failure to observe the requirements of the law as to contracts does not always invalidate the claim of the surgeon to compensation from employers. In Indiana it was held, Terre Haute and I. R. R. Co. vs. Stockwell, 20 N. E.; Amer. Digest, 1889, p. 3019, where the defendant's train injured a person, the conductor employed the plaintiff to render medical aid, and informed him at the time of the accident that he would leave the injured man in his care for treatment, "the terms of employment extended beyond the mere dressing of the wounds, and covered all services necessary until convalescence." It is clear, therefore, that the surgeon would have been liable for neglect had he abandoned the injured man or

failed in any way to render him the best service obtainable from surgeons of the first class in that vicinity.

It is a principle of law that liability for damages flows out of the relationship of the surgeon to his patient, without regard to the element of employment, and that it may result from negligence in treatment, in prescribing, or in giving instructions to the patient how to take care of himself when under treatment. See Leighton vs. Sargent, N. H. 460, and Carpenter vs. Blake, 60 Barbour's Digest, p. 485.

Story, "On Bailments," p. 433, says: "In all cases where skill is required, it is to be understood that it means ordinary skill in the business or employment which the bailee undertakes; for he is not presumed to undertake for extraordinary skill, which belongs to a few men only in his business or employment, or for extraordinary endowments or acquirements. Reasonable skill constitutes the measure of the engagement in regard to the thing undertaken."

Elwell, "On Malpractice," points out some of the defects in establishing the responsibility of physicians and surgeons, inasmuch as the operation of causes and influences over which the practitioner has but little or no control may form a large part of the grounds of action; matters that are so occult that no human foresight is able to anticipate them before they have completely deranged the plans of the practitioner, bringing about a result entirely different from that which was confidently expected.

Another element in actions for malpractice which must not be lost sight of is "the change and advancement in medical knowledge as influencing both diagnosis and treatment, tending constantly to elevate the average skill and intelligence required by law in the determination of liability for negligence and want of ordinary skill." See Small vs. Howard, 128 Mass., p. 131.

The surgeon should remember that determining the degree of care and skill is a mixed question of law and fact. The questions of law are always determined by the court, while the questions of fact are always matters of evidence to be determined by the jury. Any experiment involving a departure

from known methods of treatment, or for the purpose of trying unknown remedies, or for the performance of operations not usually employed by the profession, in the event of an unfortunate result, renders the practitioner liable. See McNevin vs. Lowe, 40 Ill., p. 209.

The profession of medicine enjoys immunity from jury service, but is obliged to obey all ordinary processes of law. The physician is, in most of the States, exempted from attendance at court, except in criminal cases. The measure and extent of his responsibility may be fairly stated to greatly exceed those of any other citizen; and while, as I have shown, the measure of his liability for damages, as well as the amount of damage to be assessed, is to be determined by a jury of laymen, it must be remembered that the evidence upon which the jury bases its verdict must always be obtained from witnesses engaged in the same line of practice as the defendant. In a large percentage of actions for malpractice against professional men it is lamentably apparent that some jealous professional rival is the instigator of the action. An exception to this rule may occasionally be found, but so rarely as to give emphasis to the force and importance of the rule.

In establishing negligence on the part of a practitioner it was held in the State of Ohio that a renowned ophthalmic surgeon, being consulted for an injury to an eye, announced as his opinion that the injured eye should at once be removed to prevent the danger of losing the sight of the fellow eye. The mother of the injured youth begged and persuaded to have something done for the relief of the pain. The surgeon, good-naturedly yielding, prescribed an anodyne, and at each subsequent visit renewed his warning as to the danger to the fellow eye. Finally, in a few weeks, the fellow eye became dim, and the youth was taken to the hospital, where another surgeon enucleated the injured eye, but not in time to save its fellow. The judge decided that the surgeon was liable for failure to do that which he himself had said was necessary for the protection of the plaintiff's sight, and the jury assessed punitive damages in the sum of $15,000.

There have been other instances in which courts of law have

held that the surgeon was liable for any damage resulting from neglect to do that which in his own judgment was necessary for the protection and relief of the patient when the thing omitted to be done constituted an ordinary procedure in such cases in the practice of the best class of surgeons in the same vicinity.

Malpractice must be proved by a preponderance of evidence, showing a state of facts from which no other rational conclusion can be drawn than that the defendant was unskillful. Pelky vs. Palmer, 109 Mich., p. 561.

It may be some relief to the surgeon to know that, in the cases of Howell vs. Goodrich, 69 Ill., p. 556, and Blair vs. Bartlett, 75 N. Y., p. 150, it was held that the recovery of a judgment by a physician in an action against a patient for the value of services rendered was a bar to a subsequent action for malpractice in rendering the services in question.

XXXIV.—ASTHMA.

BY R. ALEXANDER BATE, M. D.

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Asthma is a disorder of nutrition, dependent upon the arthritic diathesis, and is characterized by paroxysmal dyspnea, due to spasmodic contraction of the bronchial tubes. The spasmodic contractions, according to Loomis, are due to a neurosis, which depends upon the existence of a peculiar diathesis. Troussou, Salter and others likewise speak of asthma as a diathetic neurosis.

Haig attributes asthma to the effect of uric acid upon the circulation in the thorax and shows that the paroxysms correspond to the natural fluctuations in the excretion of uric acid.

Modern opinion seems to consider asthma a neurosis of the branches of the pulmonary plexus due to arthritism. In nasal or hay asthma, it is believed, uricacidemia so alters the nutrition of the spheno-palatine branches as to cause temporary paralysis, thus inducing hyperesthesia and turgescence of the nasal mucosa. In bronchial asthma uric acid in the blood so alters nutrition as to cause a neurosis of the branches of the pulmonary plexus, thus inducing hyperesthesia and engorge-

ment of the bronchial mucosa, spasmodic contraction of the muscular fibers and the various manifestations of deranged catabolism.

The manifestations of functional derangements are: The diminished quantity of oxygen and water excreted by the lungs; also the fatty acids, the octahedral crystals of Leydan and the spirals of Curschmann found in the expectoration.

Loomis found the oxygen of the expired air was almost entirely replaced by carbonic acid. The exact pathology of the gravel-like bodies and mucous pearls of the sputum is not clear, at present.

Asthma frequently alternates with neuralgia, migraine, angina and cardialgia—all diseases due to uricacidemia. The famous case of Peter the Great, and many others, have been cited where the asthmatic manifestations gave place to gout. The asthma became relieved as the blood was freed of uric acid. Gout developed because the uric acid was precipitated from the blood into the tissues.

The protean manifestations of arthritism can be understood if we regard the entire vascular system as one organ, upon which the perfect nutrition of every other tissue in the body is dependent. If the blood when most alkaline becomes loaded with uric acid, the size and relative nutritional capacity of this vascular organ is greatly diminished. Thus the nutrition of every structure in the body may be modified. However, some tisue, either by inheritance or acquisition, is weaker than the rest and first makes manifest the deranged nutrition. Molecular starvation causes loss of function of the cells (deranged cell-metabolism) in all of the diseases of uricacidemia.

The other class of arthritic disorders occurs when from lessened alkalinity of the blood the poison is precipitated into any of these numerous adjacent tissues. Heredity, anatomical and physical causes especially determine the site of this precipitation. This second class of diseases are characterized by the manifestations of an actual irritant, instead of being merely functional disturbances, as in the first class.

Asthma belongs to the first class, pulmonary weakness being the predisposing cause. Any age may be afflicted, but the

greater proportion of cases occurs during adult life. Males are affected twice as often as females, and the disease is transmitted along the male line. Heredity can be traced in fifty per cent. of the cases. Arthritism in some form, perhaps, could be observed in every instance. Attacks come on most frequently at the beginning of the alkaline tide, which is from two to four o'clock in the morning, when the blood is surcharged with uric acid. Bronchitis is present in eighty per cent. of the cases; intestinal indigestion characterized by flatus, and skin diseases also occur.

The causes of asthma may be divided into two classes: First, the systemic or essential cause, the arthritic diathesis; second, the local or exciting cause of the attack.

The first of these is perhaps present in every case. Loomis says: "Unquestionably the primary cause of asthma is some constitutional idiosyncrasy."

Aneurisms of the aorta and other mediastinal tumors in certain instances, have produced asthma. These tumors press constantly upon the pneumogastric nerve, yet the asthmatic paroxysms agree with the alkaline tide. Instances of this kind seem to emphasize the necessity of both diathesis and neurosis. The pressure explains the neurosis, and the paroxysms occurring only during the alkaline tides show the arthritism.

The second class of causes—the local or exciting causes—can only act when the first exists. That is the condition essential to the paroxysm, as turgescence, hyperesthesia and spasmodic contractions can only occur when the nutritional disorder has resulted in a neurosis of the pulmonary plexus.

Among the exciting causes may be mentioned: Irritating inhalations, dust, smoke, chemical vapors, fumes of sulphur, burning sealing-wax, vegetable irritants, odors of ipecacuhanha, roses, hay, ragweed and emanations from animals. Also emotional disturbances, sudden chilling and climatic influences, all of which affect the relative alkalinity of the blood. Among the reflex causes may be mentioned an overloaded stomach or rectum and uterine disturbances. Chronic inflammations and diseases of the nasal mucous membrane, cardiac

disease and emphysema may likewise produce asthma. Too sudden arrest of chronic discharges, retrocedent gout, syphilis, skin diseases and renal diseases are classed as excitants.

The relation of phthisis to asthma seems an unsettled question. Some regard pulmonary tuberculosis as an antecedent disease having a causal relation to asthma. Others regard asthma as antagonistic to phthisis and believe an arrest of the tubercular trouble occurs with the onset of asthma. The anatomical changes observable in asthma only occur when the disease has become chronic. They are products of inflammation incident to chronic bronchitis and the emphysematous condition resulting from habitual overdistention of the air cells.

The asthmatic syndrome is a classical portrayal of uricacidemia; the prodromal buoyance gives place to corresponding languor and depression of spirits. Ingestion of any of the xanthin group clears the blood of uric acid and causes exhilaration only to be followed by an increased uricacidemia when the alkaline tide begins. Sleeplessness, pruritus and headache are marked. At first there are voided large quantities of limpid urine, in which the uric acid is diminished. This soon gives place to scanty, high-colored urine loaded with urates. The paroxysm comes on usually during the alkaline tide—in the small hours of the morning—after a meal that raises alkalinity or during the afternoon alkaline tide from three to six o'clock. The capillaries are obstructed, the veins distended, the surface temperature below normal and the extremities cold, blue and shrunken.

The pulse is small and thready. The sufferer rushes to the window for oxygen, regardless of the outside temperature. The high arterial tension thus manifested explains the frequent presence of bronchitis, acid dyspepsia, renal and skin diseases.

The physical signs, together with the history, make it impossible to confuse asthma with any other disease. The attacks may last from a few hours to several days and have a great tendency to become chronic. Emphysema and dilatation of the right heart usually are found in those having suffered for years.

Modern treatment has not only been able to cut short the attacks in most instances but to prevent a return as well. A cure, in the sense of immunity as results when cured of certain microbic diseases, of course never occurs in a disorder of nutrition. The same nutritional disturbances will cause a return of the disease.

Since arthritism is the essential cause of asthma, prophylactic treatment should be begun in the children of all lithemic individuals, especially the sons of asthmatics.

Prophylactic treatment embraces proper hygiene and diet. The environment should be changed where several generations have been reared upon the same soil under identical conditions. Oxidation should be promoted by an out-of-door life, mountain climbing, sea voyages, bathing, massage, etc. Warm, dry climates are to be preferred and flannel should be continuously worn.

The diet should be as nutritious as possible, and free of the uric acid group. No tea, coffee, chocolate, alcohol, red meats, bananas, strawberries or tomatoes should be used. The lentils and articles of diet containing salicylates and phosphates (in other than nuclenic form) are serviceable. Since a deficiency of oxygenation is the cause of the products of incomplete metabolism, that class of food that carries with it most oxygen, the carbo-hydrates, should constitute the greater part of the diet. As expressed by Stewart, "With a diet containing less proteid and fat and more carbohydrate, the oxygen deficit would be less."

The medicinal treatment embraces the management of the attack and the limitation of the diathesis. For the control of the attack the exciting cause must be removed and the uric-acidemia must be overcome. The exciting cause should be ascertained; and if it be irritating inhalation, reflex or mechanical, atmospheric or emotional, auto-intoxicant or extraneous, it should, if possible, be removed.

Freeing the blood of uric acid re-establishes the circulation, opens the obstructed capillaries, empties the engorged veins, overcomes the cyanosis and permits relaxation. The thera-

peutic measures overcoming uricacidemia are the hypodermic injection of morphine and atropine sulphates, hydrochlorate of apomorphine, bisulphate of quinine and acid salts of similar alkaloids. Oxygen and the nitrites may be used by inhalation. The nitrites both free the blood of uric acid and dilate the capillaries. The drugs most popular for internal administration—the iodides, the acid phosphates, the coal tar derivatives and such depressants as lobelia and tobacco—have also been shown by Haig to raise the acidity of the blood.

The diathetic or curative treatment should be administered during the interval. It consists in removing the uric acid from the system and in permanently keeping down arterial tension by a diet free of the xanthin group. The medicaments eliminating uric acid from the system are the salts of lithia, the salicylates, piperazine and other uric acid solvents. Acid salts of arsenic and quinine are supposed to lessen its production in the system. The suprarenal extract is indicated for its tonic action on the cardio-vascular apparatus, aside from any action it may have upon retrograde metamorphosis. Cholagogues and laxatives to unload the liver and intestines are both necessary during the attack and the interval.

Holding in view the principles laid down by the school regarding asthma as a diathetic neurosis(the treatment elucidated by Alexander Haig has undoubtedly been the most satisfactory in my hands.

DISCUSSION

Dr. Thomas H. Stucky, of Louisville, Kentucky.—Mr. President: Like everything that is done by Dr. Bate, the paper he has presented to-day seems to cover the ground very thoroughly. The question of asthma has been a serious and interesting one to me, from the simple fact that personally I have been able to give a great deal of attention to it. For ten years I have been teaching and believing that functional asthma was dependent entirely upon a disturbance of metabolism, and that the outbursts or attacks were identical with those of acute gout, in that the surcharged condition of the circulation, so long as the blood was carried into the vessels,

remained in the circulation before being disseminated into the tissues, and that as soon as this dissemination took place then we would have an attack. I believe that has been verified frequently.

As to the means for the relief of this condition, I do not agree with the essayist that we can depend upon iodides and oxygen, etc., for its eradication and elimination, but that we have to go further back. If we start with the intestinal tract we will find there a disturbance of metabolism, as intestinal indigestion, which is dependent upon faulty gastric digestion. We find imperfect insalivation, which is either dependent upon imperfect mastication or acid foods taken at the time of eating. If this be true, and the attacks come on in an acid condition, we have attacks of hyperchlorhydria, which precede amylaceous dyspepsia. If this line of reasoning be true, and it has been demonstrated in many cases by myself, as well as by others, the primary deficiency would seem to lie in mastication and the absence of ptyaline. If there is an absence of ptyaline primarily, there is a demand at the very onset for those agents which carry on starchy digestion, eliminating all those which we have been taught to use. I know when I am going to have an attack of asthma, but I do not know it by what I feel, but what I eat. I know what it is going to do, and if I followed the advice of Drs. Love and Reynolds, probably I would ward off some of these attacks by adhering strictly to water.

Another point. We find those persons, who are asthmatics are sweet-eaters. We find, as a rule, that they are people of full habits. As a rule, they are lazy. In other words, they do not take a great deal of physical exercise. The essayist has told us that with these outbursts, with the surcharged condition of the circulation with acidity, with hyperchlorhydria, which is followed by amylaceous indigestion, which must be an intestinal fermentation, the question arises, Is it not possible that many of the asthmatic attacks may be strictly mechanical? Take an asthmatic with functional asthma, percuss carefully over the splenic and hepatic flexures, you will find the line of tympany is carried up into the heart space every time, and the nipple beat is dislocated far to the right, or elevated two inches out of its normal position. The main fact of this displacement is interference with the aeration or oxygenation, with a marked disturbance of oxidization. I submit the matter on these grounds.

DR. CHARLES L. MINOR, of Asheville, North Carolina.—The author of the paper has dwelt but lightly upon the question of the relationship between asthma and tuberculosis. I have had an opportunity of observing some of these cases and have come to believe not only that every asthmatic has the uric acid diathesis, but that asthma and tuberculosis are to some extent antagonistic. Many of my patients with pulmonary tuberculosis have some manifestation of the uric acid diathesis in their systems and such cases generally do the best. I have a patient, a woman, in this city, whose case is a beautiful exemplification of this antagonism between tuberculosis and gout noted by Dr. Fothergill who once said, that "when I was a young man I had to choose between dying of gout or tuberculosis, and of the two I chose gout." This woman, suffering from tuberculosis, comes from an intensely uric acid family. At such times as her pulmonary condition is unsatisfactory, I have no difficulty, by pushing a sweet diet, candies, etc., those elements which favor gout, in producing in her pronounced gouty symptoms, and every time I have produced gouty symptoms I have brought about amelioration in her pulmonary affection. As long as this woman continues to have gouty symptoms I shall feel entirely content about the tubercular infection. Her condition has been a regular pendulum in that when the tuberculosis goes up, the gout declines, and vice versa, and if what I have found in her case is borne out by the experience of other physicians, I cannot agree with those who consider asthma as justifying an unfavorable prognosis in tuberculosis. Of course, there are certain cases of pseudo-asthma, due to entirely other causes, which are of ill omen, but in ordinary cases the prognosis in pulmonary tuberculosis is improved by the coexistence of gout or the uric acid diathesis.

DR. DUDLEY S. REYNOLDS, of Louisville, Kentucky.—I do not believe that every case of asthma is due either to gout, tuberculosis, or to a uric acid diathesis. I have seen many cases of asthmatic breathing due to foreign growths in the nasal passages, especially post-nasal and pharyngeal polypi, and the asthmatic breathing has disappeared at once upon the removal of these growths.

DR. THOMAS H. STUCKY, of Louisville, Kentucky.—Referring to the remarks of Dr. Reynolds, I believe Dr. Bate clearly

eliminated all mechanical obstructions and reflex causes, in so far as they relate to the production of asthma. He eliminated nasal obstruction, whether produced by polypi, exostoses, or spurs.

DR. BATE (closing the discussion).—I wish to thank the members who have discussed the paper. I desire to emphasize the causes of asthma. The first and essential cause is a uric acid diathesis. The secondary or exciting causes are those resulting from a foreign body or irritation in the nose, etc. These exciting causes must first be removed before we can expect to successfully control the asthma, and the diathesis must likewise be treated in the interval to prevent recurrence of the asthma.

XXXV.—DIFFERENTIAL LEUCOCYTOSIS.

BY L. H. WARNER, A. M., Ph. D., M. D.

BROOKLYN, N. Y.

In former times the lymphocytes and mononuclear leucocytes were differentiated from the colorless blood corpuscles known as leucocytes. The characteristics of the former were known by their relatively large, round nucleus and an extremely small hyaline blastema, while the latter exhibit one or more very strong various shaped nuclei. It remained with Virchow to differentiate between these cellular elements and to distinguish the lymphocytes as the mother cells of leucocytes.

Experimentations in recent times have given us a better insight into the etiology of leucocytosis. Einhorn demonstrated that the ordinary leucocytosis is brought about by the multinucleated neutrophilic granulated leucocytes of the bone marrow and not through the increase of leucocytes. Uskoff, Stoher, Benda and Frankel, like Virchow, still retain their opinion that all leucocytes without exception deviate from the lymphocytes.

Ehrlich in his recent work on Hematology takes a different stand in as far as he admits of a second method of creation aside from the uninuclear and neutrophilic marrow cells.

He claims their creation from the large mononuclear leucocytes. Within the bone marrow the multinuclear leucocytes should be created from the uninuclear myelocytes, but in the circulation in which normal myelocytes do not exist, they should deviate from the uninuclear leucocytes resembling the former very much in appearance. The latter, according to Ehrlich's description have a more or less round nucleus and basophilic non-nucleated cytoplasma, but according to his opinion, do not belong to the lymphocytes; on the contrary, on account of the breadth and volume of their cell, that is to say, on account of their abnormal morphological habitus, he gives them a special designation.

It cannot be denied that if we examine hematoxylon preparations we find that the uninuclear leucocytes appear to come into close connection with the multinuclear ones, as both have a non-granulated and acid affined cytoplasm. On the other hand, in hematoxylon preparations, the large uninuclear leucocytes are hard to be differentiated from the non-nucleated myelocytes. The triacid and methylene blue eosin stains permit us to say that the uninuclear leucocytes can be separated from the myelocytes as well as from leucocytes.

Although the non-granulated, basophilic, large, uninuclear leucocytes have the same affinities as the lymphocytes, it is the intent of Ehrlich to separate them as leucocytes on account of their deviating morphological appearance.

The present error seems to be due to the classification of the various cell forms according to their staining affinities instead of including in this the external morphological habitus and their relative size. Among the eosinophilic and neutrophilic marrow cells, we will find some specimens with a large round nucleus and a small blastema which, as a general rule, have been classified as eosinophiles without distinguishing between them from other uninuclear eosinophile cells with a large body and a relatively smaller nucleus.

Experiments with methylene blue and methyl green pyrodine stain lead us to consider these uninuclear cells more nearly related to the lymphocytes. The claim that small lympho-

cytes may only be found in the thymus glands, and that the uninuclear leucocytes are only found in the spleen and bone marrow, are unwarranted, as uninuclear leucocytes are also found in the thymus glands and typical small lymphocytes are easily found in every specimen of bone marrow.

No one has been able to distinguish the granulated uninucleated eosinophile cells derived from the spleen from those that were derived from bone marrow.

The morphological understanding of lymphocytes does not confine itself to certain individual cells nor alone upon any sized non-granulated cells with a relatively large round nucleus and small blastema (for in that instance we would always be confronted with a certain individual juvenile stage of age), but it also comprises all cells with non-granulated basophilic cell bodies independent of the nuclear form within them. The same holds good for the granulated leucocytes. The myelocytes are not to be considered spread out as cells deviating from the bone marrow, but rather as characteristic granulated cells from the marrow, but which can also be found in the spleen and thymus glands. My investigation corroborates the prevailing idea that young leucocytes develop into old nucleated leucocytes, although some recent investigators claim that the lymphocytes develop into non-granulated basophilic polymorphonuclear lymphocytes. This latter theory I am unable to support, the results of my experiments contradicting said theory. The varying opinions are, to my mind, caused by too close adherence to one or the other staining methods which have been in vogue for years past. It having been demonstrated by Richter, Metchnikoff and others that the leucocytes are the carriers of nuclein to the various tissues and that said nuclein was stored within the nucleus of the leucocytes, it appeared both reasonable and interesting to enter upon experiments regarding the staining affinity of nuclein, using for such purposes the basic stains only. The various basic stains added in equal proportions to 5 per cent. solutions of nuclein, demonstrated that Bismark brown exhibits the greater affinity and if employed for the staining of blood speci-

mens, it should be used after the specimen has been previously treated by the eosin-methylene blue method. By this method cells in process of karyokinesis can be thoroughly studied and a clear line of differentiation between lymphocytes, mononuclear and polynuclear leucocytes can be established.

The normal number of leucocytes in human blood is from 8,000 to 9,000 per mm., and deviations of 1,000 in either direction are considered as normal. The number of leucocytes within the blood is influenced through various causes, as vasomotor phenomena, variations in the volume of plasma. Aside from this their division within the blood is physiologically changeable, and this latter condition can be aggravated through sickness. They appear or disappear in the circulation upon certain influences. (Chemotoxis.) Their increase is denoted by leucocytosis, the latter by leukopemia.

Leucocytosis, generally speaking, represents a temporary increase in the number of white corpuscles of the polynuclear neutrophile form. The theoretical conception of leucocytosis gives as a cause food supply or foreign growth.

Thus we must make a clinical pathological classification of the different leucocytoses.

1. Physiological leucocytosis which must be divided:
    a. In a digestive leucocytosis.
    b. A leucocytosis due to pregnancy.
    c. A leucocytosis of the new born.
2. Pathological leucocytosis which must be divided:
    a. A leucocytosis due to inflammation.
    b. A leucocytosis caused by malignant tumors.
    c. A posthemorrhagic leucocytosis.
3. A leucocytosis influenced by medication.

A digestive leucocytosis may be produced in man or animal by fasting for a period of ten hours and not more than twenty-four hours. This class of leucocytosis may be produced in any healthy subject. The increase of leucocytes varies from 5,000 to 10,000, and an examination of the stomach contents will reveal free hydrochloric acid. The white cells appear mostly in polynuclear form, the nucleus strongly contracted.

A leucocytosis due to pregnancy was first demonstrated by Virchow (Cellular Pathology, Vol. I., page 178), who noted a monthly increase in the number of leucocytes, and explained as a cause the gradual enlargement of the lymphatic vessels surrounding the uterus. Von Limbeck differs from Virchow, claiming that a leucocytosis of pregnancy is due to spasmodic inclinations to feeding and the enlargement of the mammæ. Immediately after confinement the leucocytosis disappears. An examination of the blood in seventeen pregnant women reveals in every case the increase in large mononuclear cells and also the contracted nuclei in the polynuclear leucocytes.

Leucocytosis of the new born was first observed by Cohnstein and Zuntz (Pfluger's Archives, Vol. 34). This class of leucocytosis is evidently due to digestion but differs from a strictly digestive leucocytosis in so far as the leucocytes predominate in the lymphocyte form.

Whenever determining as to the classification of a pathological leucocytosis, it is necessary to be well informed regarding the diet and interval of space from last meal hour as well as the general interval of time between meals. Leucocytosis due to inflammation increases or decreases according to the increase or decrease of fever, hence a glance at the temperature chart illustrative of the preceding twenty-four hours is of importance and a necessity in order to obtain accurate results. The origin of this class of leucocytosis according to Buchner (Berliner klin. Wochenschrift, 1890) is due to the protein contained within some and all micro-organisms, or, in other words, to the liberated torius. Bocckman's investigations (Archiv. fur klin. Med. Vol. 29, page 481) tended to establish some connection between the run of temperance and the number of red and white corpuscles, resulting in the finding that the number of red corpuscles in acute infectious diseases stands in indirect and that of the white corpuscles in proportional comparison. Thus, for instance, in croupous pneumonia we will observe a more or less noted increase of polynuclear leucocytes during the fever period, with a subsequent decline of leucocytes with a decrease of temperature.

The increase of leucocytes is from 5,000 to 20,000 and the average number of polynuclear leucocytes is from 80 per cent to 82 per cent of the total leucocytes. The polynuclear leucocytes will show a division of the nucleus into three or four distinct nuclei. A similar picture is presented to us in rheumatism, measles, malaria, erysipelas, scarlatina, etc.

The fact of a leucocytosis caused by malignant tumors has been corroborated by Velpeau, Paget, Bouillaud and others, and this fact has been demonstrated in a number of cases where prior to an operation for removal of the growth a leucocytosis existed, which entirely disappeared after the operation. A series of blood examinations of cases embracing carcinomas of the stomach, uterus, mammæ, esophagus and of epitheliomas of the rectum, penis, lips, etc., showed an increase of leucocytes in each case from 3,000 to 14,000 per mm.

Grawitz, in the *Deutsche med. Wochenschrift,* 1893, reports that injections of carcinomatous extract into guinea pigs caused a transmission of lymph from the tissues into the blood circulation, thus causing a dilution of the blood and the subsequent pressure is supposed to permit the escape of a large number of leucocytes from the tissues. According to his theory, we must assume the fact that a leucocytosis will appear in carcinomas as soon as the cancerous substances are resorbed. Investigations on my part have shown me in a number of cases of tumor that an already existing leucocytosis increased upon the softening of the tumor. In all leucocytoses due to malignant growth we will note an equal increase in mononuclear and polynuclear leucocytes.

Posthemorrhagic leucocytosis occurs 15 to 30 minutes after all hemorrhages, denoted by an increase of from 6,000 to 15,000 white corpuscles, such increase remaining permanent for some days. Origin of such leucocytosis must be attributed to the thinning of the blood caused by hemorrhage causing an influx of leucocytes containing lymph and tissue fluid into the circulation.

To determine and classify a leucocytosis influenced by medication is a most difficult task. The presence alone of a leuco-

cytosis nor the knowledge of medication employed are insufficient information upon which to base a positive diagnosis by means of a blood examination. The differential influence of various therapeutic agents upon the leucocytes is best noted by repeating the results of various investigations.

Hirt (Muller's Archives 1856, page 174) was the first to note the influence of therapeutic agents upon the number of leucocytes in the blood. He noted that the leucocytes increased after the administration of tr. myrrh, Pv. amara., tr. cinchona. Meyer (Archive fur experim. Pathology and Pharmakology, Vol. 35, page 77) followed Hirt's experiments and demonstrated the increase of leucocytes after administration of ethereal oils. Binz and Pohl continued researches on the same lines, and amongst the latest investigators we find Lowitt, Witte, Pohl and Winternitz, whose experimentations comprised comparative results obtained by administration and subcutaneous injections of extracts prepared from the spleen, thymus, thyroid, bone marrow, etc. The differential results obtained from inorganic and organic medication demonstrated that although a slight increase in the number of leucocytes occurs after inorganic medication, the mononuclear and polynuclear form prevailing; that the administration of organic remedies is followed by a marked leucocytosis, the lymphocytes being most prominent. My own experiments corroborate the above facts, and repeated blood examinations of the patient placed on organic remedies, permits, with the use of the hot stage, to observe the full stages of karyokinesis. The trend of modern medicine is in the direction of organic therapy, and we have learned that organic therapy is an important factor in the physiological function of the cell nucleus, which, from observation, appears to be necessary to the formation and building up of organic matter. With the aid of the microscope, with advanced knowledge in pathology, physiology and bacteriology, we have learned to know that non-nucleated cells, although capable of living, are not capable of reproduction, and we must look to the nucleus as the seat of functional activity of the cell, or, indeed, of the entire organism. Confronted with

such facts, corroborated in the best laboratories of both continents, we must appreciate the volume of information leading to a correct diagnosis, which may be obtained by blood examinations, the examiner having been previously supplied with a short history of the case, including hygienic surroundings, diet, medication, etc.

In order to definitely and finally determine as to the classification or cause of leucocytosis it is of the utmost importance to undertake the chemical and pathological examination of the urine. Differentiation as to the class and amount of phosphates found in the urine is an important factor in this direction. Thus, in a digestive leucocytosis, in a leucocytosis caused by inflammation or a leucocytosis due to malignant tumor, we will note an excess of phosphates in the urine, consisting of the earthy phosphates; in a leucocytosis influenced by medication, if such medication was administered upon rational lines, ye will find a normal quantity of phosphates, while the other leucocytoses herein mentioned will show an increase in the triple phosphates.

The destruction of the nucleus of the leucocytes will cause the appearance of earthy phosphates in the urine in abnormal quantities and, therefore, if we are able to demonstrate by staining processes that leucocytosis is due to histological changes within the leucocyte and we subsequently have this corroborated by the finding of earthy phosphates in the urine, we are at once confronted with the demand for rational therapy to replace the organic phosphates which through destructive processes have been eliminated in the urine. Since this fact has been established by research work in the various laboratories of both continents, we have learned to give more consideration to the treatment of disease with organic remedies, and this especially refers to nuclein.

In everyday practice the physician has to deal with cases, the majority of which eliminate urine showing an abnormal amount of phosphates and it is in all such cases where the phosphatic elimination consists of the earthy phosphates, that nuclein medication is indicated. The efficacy of nuclein in

such cases is demonstrated within 24 hours after nuclein administration, when an examination of the urine will reveal a decrease in the phosphates, and where an examination of the blood will reveal that the number of lymphocytes is the predominant number of white corpuscles within the blood.

From the foregoing, it seems to be thoroughly demonstrated that in order to determine the cause of leucocytosis, it appears rational that physicians should not rely solely upon an examination of the blood, but should also obtain an analysis both chemical and pathological, of the urine, in order to arrive at a correct diagnosis.

XXXVI.—THE PHILOSOPHY OF THE SCIENCE AND ART OF MEDICINE.

BY WILLIAM F. BARCLAY, M. D.

PITTSBURG, PA.

The truth in science and art has engaged the attention of man in all ages. It has been the work of thoughtful minds individually and collectively to determine that which is truth and falsehood. The terms true and false philosophy are appropriately applied to the results obtained in rational conclusions. The truth in science and art is essential in the comprehension of all which can be known by research at our command. The philosophy of the science and art of medicine is the comprehension of the truth, in the investigation of the sciences, which enables the physician to arrive at rational conclusions in the study of physic and the physical laws which govern organized matter, in normal and pathological conditions.

The physiological forces which govern animated life are subject to physical laws which control organic life in its varied forms. The forces which govern life are internal and external, being usually termed natural laws.

The comprehension of all which pertains to medicine in its varied theoretical and speculative possibilities means more than at first thought might seem relative in the study of that which pertains to the preservation of human life and health. It is not the psychic and physical life alone which claims our consideration but also the laws which co-ordinate the forces which initiate life and correlate the elements in their equilibrate actions. The intimate study of living organisms is to the student of animated nature more and more interesting as we become familiar with the laws of nutrition and their physiological actions. Disease is a deviation from normal physiological action of the functions of the body. Physiological action and the laws which co-ordinate the functions of the body determine the preservation of health when properly understood and observed.

The title of this paper is more comprehensive than at first seemed to the writer in a discussion of the philosophy of the science and art of medicine. It will be only possible to suggest that which is within the limit of time of a subject of vast importance to the scientific physician. The basis of medicine is comprehended n a thorough academic education in the best schools and colleges with collateral studies which are pertinent in an education which fits the student for the study of medicine. Medical schools and colleges are more numerous than are essential for the procurement of a medical education.

The preliminary education of the student is of vital importance and should be all that is comprehended in a university and collegiate education. Adaptation with personal industry in the pursuit of a medical education should characterize the student who would meet the requirements of the present time in the profession of medicine. It is neither pertinent nor possible to discover the qualities of mind and heart which should sustain the character of the physician in the great work that devolves on every one who upholds the dignity of the profession of medicine. Moral and religious character should sustain the life of every physician in the battle which none

but they who engage in the irksome responsibilities and activities of medical practice can realize. The suggestion of medicine as a business proposition degrades and demoralizes the aspirant as perhaps no other calling can.

The philosophy of the science and art of medicine is not within the pale of reasonable intelligence without indefatigable industry in the requirement of all that should characterize the true physician.

"There are more things in Heaven and Earth, Horatio,
Than are dreamt of in your philosophy."

Perfection in the ideal physician is a rare observation in the profession, and in the lives and work of such men the future of the profession of medicine is to be written in all that pertains to professional honor and dignity. The ordinary majority cannot sustain the profession in the light of our present educational advantages, nor assume the responsibilities of present requirements of our civilization. That a standard less than that assumed will sustain the profession of medicine no one at all familiar with the history of medicine will for a moment presume to suggest for the greatest and best profession which man can choose in the varied callings of life.

The abilities of men who choose the profession of medicine are as different as the human intellect in all its possibilities.

History, poetry, literature, science and art have been enriched by the profession of medicine in work which has immortalized individual character. Literature has been especially amplified in prose and poetry by medical men in productions of the rarest and best qualities in the portrayal of human character in its best and worst possibilities. The physician knows more of human life and character than other men do. It is in this fact that he should first know himself. "Man, know thyself" is an imperative command. It is not possible to know other men without this essential knowledge.

One who pretends to heal the sick assumes the title of Doctor; it matters not what the preparation or attainment of the individual may be, the profession of medicine bears the onus of all that is assumed to its degradation.

The history of medicine is interesting in the progress of the world's history. Nothing is more obvious than the gradual advancement of medical science. The standard of the profession of medicine should be elevated and sustained by the united efforts of medical schools. Medical schools should be liberally endowed. The teachers should be selected on account of distinction in education and large experience in the practice of medicine. The claims set out by physicians of foreign birth and education should be carefully scrutinized and considered before they are licensed to practice medicine in the United States. Germany annually sends the United States a large number of physicians, of pretense and assumption, who are a detriment to the profession of medicine.

The varied systems of medicine that claim consideration are assumed to be founded upon tenets which relatively sustain a rational practice. The system which is the oldest and best, according to tradition, is believed to have been founded by Hippocrates, and to him the name of Father of Medicine is ascribed.

It is apparent that medicine is a progressive science in the practice of the art of medicine and surgery. Each year adds new studies which are essential in the qualification of the physician for successful practice. It is no longer optional with the student as to required time in the preparatory education for practice, it is obligatory that certain studies be pursued in the course of a medical education in order that the student may enter upon successful practice.

Disease is as old as time itself, and is the result of transgression of physical law.

The possibilities in the profession of medicine claim the energies of man in the fulfillment of the obligation that man owes to himself and his fellow man in a consecration to the highest and best purpose of manhood. The history of ancient and modern medicine is interesting in the revelation of the truth which time and events in the common welfare of the human race have demonstrated in a better condition of all that tends to the comfort and prosperity of the race. The emi-

nent purpose of the profession of medicine is prospectively the more immediate united effort of the membership in the building up of the science and art of medicine, which will command confidence and respect of the human family in all that pertains to the common welfare of the human race. The incursions made by the varied impositions which have attached to the profession of medicine have hindered and thwarted the aim and purpose of the science and art of medicine in the loss of confidence and respect which rightfully belong to the calling of medicine.

The history of medicine is a truthful exposition of all that disease and death have taught in the amelioration of human suffering and the prolongation of life.

The activities of the educated mind have suggested the resources of the science and art of medicine in the palliation of suffering in its multiform invasions on organized matter in animal life and in the deterioration of physiological action in the perpetuation of life and health. Environment in its resources has modified all organized living forces in the conditions afforded for the development of living matter and the perpetuation of physical life. Degeneration is an evident factor in all physical life and is combatted by the preservation of natural conditions. Speculative medicine is based on observation of natural law and the preservation of natural conditions in all their fruitful possibilities by the application of the results obtained from experience in the use of medicine as suggested by science and art in averting the causes which tend to disease and death. Medicine has evidently aided in the preservation of life and health and has abbreviated suffering in its multiform incursions upon psychic and physical life.

Medicine claims the activities and energies of the ablest and best minds in the blessings which attend the alleviation of human suffering. It is to be perpetuated and made more available in the continued united efforts of the best men in the profession of medicine in the establishment of confidence and respect for honest, earnest, scientific work in the art of medicine. The possibilities of medicine can neither be con-

jectured nor known in the aggressiveness of the profession of medicine. The impossibilities of a few years ago give way to the simplicity of medical art of to-day. Scientific progress in the observation of disease, of its invasion, in preventive measures tend to the preservation of life and health.

Who can estimate the incalculable benefits conferred upon the human family by the humble physician, Doctor Jenner, in the suggestion of vaccination and the protection afforded by its benign results. Humanity is laid under a lasting debt of gratitude to Prof. Pasteur in the demonstration of the great truth that germ life in its activities is the bane of surgical procedure in traumatic injuries, in accidental and exploratory surgical art. It is but just that the same praise be accorded Prof. Lister in the application of antiseptic precaution in surgical practice in the prevention of infection of wounds and the results which follow the introduction of toxic germs into the circulation of the blood and the results which follow septic poisoning.

We can with just pride and confidence refer to the work done in preventive medicine, in means made use of for the prevention and cure of disease.

It is from the incalculable benefits conferred upon humanity that scientific medicine is considered and approved in the blessings bestowed upon the sick and suffering, in the cure of disease, in the alleviation of pain, as well as the prevention of the spread of disease. The hindrances in the science and art of medicine are many, more especially attributable to imposition and fraud in the name of medicine than all other causes combined. Human credulity is a fruitful field for the impostor; the opportunities seem to not grow less in this age of enlightenment and civilization for the suggestion of means for imposition upon sick and suffering. Anything offered in the name of medicine, however unreasonable or injurious, is certain to receive consideration and trial, even at expense of life and health. In the profession of medicine hindrances in the science and art of medicine are internal and external in various illegitimate methods adopted for the attainment of

fraudulent impositions upon public confidence. The declarations given by the medical press in exposure of fraud and imposition are in unmistakable language, based on personal observation by those who have seen and felt the injustice done in the name of the profession of medicine.

It is not possible to write the future of the profession of medicine, nor would I forecast the history which time alone will reveal, but it is certain that the future of medicine will be wrought out by the educated, earnest, honest, faithful members of the profession in an ideal standard of professional integrity based on honor and fidelity in all which tends to the common weal of humanity.

I do not care to suggest, neither will I prognosticate, the end of all which is not of truth and justice in the welfare of the science and art of medicine in the highest interest of human life and health. Sufficient is it for me to know that there must be a reasonable truth and justice in acts which determine destiny of human life in the account which every man must give to God. The moral law of the science and art of medicine is comprehended in four words: "Thou Shalt Not Kill."

A standard of less responsibility in the actions of every physician tends to skepticism in the results attained in the profession of medicine.

The regular school of medicine has and must solve the destiny of the profession of medicine; other systems of whatever pretension or character are exotic and must perish in the light of the advancement in scientific medicine. The regular profession should insist and demand a better system of attainment in all that pertains to the science and art of medicine. The approval of all that is for the highest and best aims and ends in professional attainment with condemnation of all that is derogatory to professional honor and dignity in a conservative consecration to the welfare of an ideal professional character. Charlatanism, quackery, imposition and fraud of all associated means set out and employed to victimize suffering humanity. The lessons of the impostor and

charlatan have so wrought upon human credulity that even the most scientific and honorable physician is brought under the ban of suspicion. Confidence has been impaired and distrust is a menace to the best directed efforts on the part of the medical profession. The multiform methods and schemes employed to impose on sick and suffering humanity have disappointed many and subverted appreciation of the best directed treatment by the most skillful physicians. There is no royal road to distinction in the profession of medicine except that which is attained by honest, earnest work, accompanied by a conscientious spirit of obligation which rests upon every man who assumes the duties of a physician's life.

Recent advances in medicine require extended courses of instructions in medical schools. Didactic teaching in recent times has imposed extended time in obtaining a medical education as well as ample clinical instruction.

Studies in mental and physical science, as well as literature, complete a medical education which affords self-confidence and respect on the part of the physician as well as that of the people. The satisfaction which attends the conscientious discharge of the duties which devolve upon every physician should be accompanied with the conviction that a complete discharge of obligation has been intelligently given to those who claim our time and consideration. Time evades nothing in the phlosophy of human events; in the intellectual and physical investigation of that which occupies the attention of man in her onward march is ever alert in sustaining the truth and relegating falsehood to the domain of false philosophy.

Philosophy has removed from conjecture in the advancement of scientific medicine the doubtful theories of the past and ascertained the truth as it is written in the living present. Labor is the foundation of success in human effort. There is no other road to pre-eminence in the medical profession. Industry, perseverance and honesty are qualities of character which, combined with moral and religious resolution, sustain the physician in his life work for God and for man.

The literature of medicine is replete in the preservation of

the observation and research of the past. It is not, perhaps, essential that medical literature of the past should be studied except that it is the foundation of the work done by the older members of the profession in the historic ages of the past. The abler and better men of the profession of medicine have not been as a rule profuse writers. Their time and talents were employed in the activities of medical practice. The combined efforts of practitioners and writers have given the profession of medicine its present pre-eminence and distinction for erudition and learning which has placed humanity under obligation for that knowledge which enables the individual in a rational way to care for life and health. Advances in the science and art of medicine are considered with care and precaution in the crucial test of distrust lest approval be given to that which is not meritorious. The attitude of the profession of medicine toward original observation is calculated to make caution a paramount consideration.

The philanthropical and business consideration of medicine has been considered in the relation which the profession sustains to the public as well as the relation the public sustains to the profession. The consensus of opinion sustains a reasonable recompense for labor done. Medicine cannot be made an honorable calling without a reasonable compensation being given for the service rendered. Medicine as a profession elevates and ennobles manhood in a most useful and distinguished life.

Prevention is at all times preferable to cure, nor is it at all possible to estimate the benefits conferred upon humanity by preventive medicine. Sanitary science in its varied applications in means made use of for the prevention of the spread of disease is inestimable in its beneficent advantages.

It is more and more evident that the medical profession has been occupied in its best directed efforts in teaching a better philosophy of life and the means best adapted to the preservation of vigorous health and physical comfort. Civilization in her onward march in the economy of life, in economic relations, has imposed burdens of incalculable interests to the sci-

entific physician. The over-exertion on the part of a large majority of mankind must be considered in the relation of hours of work and proper rest. Physical training by competent instructors in schools at the present time is a part of the school curriculum to the advantage of the rising generation. Labor without proper rest and exercise induces physical degeneration in psychic and physical life in the loss of health and early death of thousands of our best and most useful men and women. Physical instructors are busily engaged in teaching the people how to take healthful exercise in systematic courses of physical instruction which should be observed by all who lead sedentary lives in their various vocations. The over-exertion of groups of organs with want of healthful exercise of other parts of the organism suggest physical training in systematic exercise of the entire body. It may be remarked that one of the most important functions of the body is never properly performed without direction as to systematic employment of the muscles which govern the function of respiration.

The selection, preparation and taking of food at proper intervals is an important vital problem which is being more carefully considered by the profession of medicine. Indigestion is a national disorder and a national disgrace. It impeaches the intelligence alike of the profession of medicine and the common sense of the people.

A problem which is more and more impressed in our advanced civilization and aggregation of population is the prevention of the contamination of water and the best means to obtain water which is fit for human use. The volumes which should be written on dietetics require more time than at present seems to be given to a subject of greatest vital interest and importance in physical economy.

The modern impression of that which is being considered in the various pursuits and professions is received rather than the results obtained after careful consideration, hence much that is adopted as truth is being reconsidered. Literally the love of truth and the wisdom of experience should be the phil-

osophy of our national method in all that pertains to social and physical economy of life. Medical science and art has done more for the human family in its research and practice than all other agencies combined in civilization and the varied economical possibilities in our moral, religious, social and physical relations in life.

The moral obligation which rests upon him who assumes the life of a physician is calculated to enforce due consideration for the weaknesses and frailties of human character. It is obvious that there is a tendency in the pursuit of medicine to lose confidence in human character in the higher moral rectitude and conduct of human life, nevertheless charity enables the physician to see more of good than evil in human conduct.

There is a higher and nobler ambition begotten of an inspiration of usefulness which fits the physician for a career of honor in the pursuit of medicine rather than mere assumption of personal fitness for responsibilities which the wisest and best fear to assume. Hypocritical pretension and imposition characterize the basest and lowest motives of human life, obliterate all evidence of responsibility on the part of him who would tamper with life and health. The best service of mind and heart in allegiance to sacred obligation in all that pertains to the discharge of duty in the assumption that an account must be rendered for every thought and act alone discharges the conscience that should distinguish the life of the true physician.

The choosing of medicine as a profession should be of the innate desire for the study of the science and art of medicine with the consecration of life and talents to the common weal of humanity in all the requirements of the frailties of life. Philanthropy should ever guide and direct the physician in his daily consideration of the requirements of those who claim his time and talents, with due consideration for his personal welfare in a just reward for his labor. It is alike unjust to himself and the profession of medicine that he should fail to claim that which is due him in a fair recompense for his advice and skill, which should be adjudged in the light of the

value of services rendered and not of mercenary motive.

There is great injustice done to the profession of medicine in impositions practiced by the charlatan, quack, and multifarious impostors who prey upon public credulity. It is incomprehensible that public credulity can be victimized by the most improbable pretense in the name of the profession of medicine. The consummation of human ingenuity and avarice seems to discover the land of promise in the weakness of human frailty in all its varied forms of real and assumed physic and physical necessity in deviation from line of physiological and normal condition.

The suggestion that a medical education is suitable for men in other vocations does not seem to be well founded in the results which follow life when the aspirant for a medical training has turned aside from medicine for other pursuits. That more men fail of success in the practice of medicine than in other callings is due to the want of adaptation and proper preparation for the practice of the science and art of medicine. Success recorded is of the highest and best purpose of him who assumes the responsibilities of the practice of medicine.

History is full of the achievements of medical men in the various pursuits in science, art, poetry and literature, as well as philanthropy in the cause of human suffering in its multiform requirements.

Although men may get gain and emolument by imposition and fraud, it seldom defrays funeral expenses; it takes wings and flies away.

The ideal physician is alike an honor to himself and the profession of medicine. The fame of him who attains the best standard is placed on an immortal tablet as lasting as history in the events of men. Men may attempt to build fame and fortune by unjust methods, but truth and justice determine the result in an equal balance between right and wrong in the estimation of eternal truth and justice.

The advances in science continually suggest new lines of study which are requisite in the science and art of medicine in a more comprehensive understanding of all which prepares

the physician for a higher and better success in the world of healing the sick, in the prevention of disease and death. Time in her research is just in her rewards. To him who labors in the cause of truth there is reasonable recompense which can neither be appropriated nor destroyed by current events. Reward at times comes slowly, but silent monuments erected to eternal truth and justice chronicle historical data of the reward of labor done for God and for man.

Silent moments of men and events mark the progress of time in the benefactions of those who have labored in the cause of truth in science and art, nor is it possible to permanently erase the reward which comes to those who have earnestly and honestly wrought out problems which benefit mankind. In the ages that are past men have solved the problems which were presented in the cause of humanity in benefactions that have lessened human misery. "He that causeth two blades of grass to grow where only one grew before is a benefactor to his race." How much more to him who has lessened human anguish and woe in the alleviation of pain. The hopeful prospect of medicine in the United States justifies the prediction that the world will ultimately look to the profession of medicine of our country for advancement in knowledge and purpose of the highest and noblest attainments in scientific medicine. We do not need to import brains or borrow intelligence. These qualities are indigenous in our own land. Our schools are ample and sufficient for our improvement if properly used.

It is not possible to read the disappointments of the hearts of the dead in the injustice done to them in the name of the profession of medicine. The army of impostors and the results of their labors upon the lives and health of their unfortunate patrons is a problem in moral and legal philosophy. Different methods are employed through different channels of moral, religious and hypocritical supposition to impress public confidence and thereby impose upon the credulity of those who seek relief from real and supposed disease.

Prospectively medicine should stand in the front rank of the

learned professions, morally and religiously in the advancement of our social system.

The association of members of the profession of medicine should be the culmination of social, moral and intellectual effort in estimating the best interests of the profession of medicine in all things which establish the welfare of the Science and Art of Medicine. Disassociation of the members of the medical profession is the individual loss of the benefits to be derived from the consensus of experience of the best men of the profession in all that the learning, intelligence and opportunities af the times may afford in building a system of medical and surgical knowledge adapted to the wants of suffering humanity.

The Ship of Medicine is doubtless not all that it should be. It is in the interest of the medical profession that the old craft should be docked and carefully examined internally and externally, and rebuilt upon plans commensurate with the requirements of the times. Our association, the Mississippi Valley Medical Association, is of modern design in the interest of the science and art of medicine. The fair broad principles of our association in the welfare of the profession of medicine command confidence and respect in the interest of a better philosophy of the highest and best attainment possible in united efforts for advancement of scientific medicine, as well as social comfort and happiness.

We envy none, neither do we disparage the ends and aims of medical associations for the advancement of the science and art of medicine.

DISCUSSION.

DR. A. P. BUCHMAN, of Fort Wayne, Indiana.—I define philosophy a little differently from most men. Philosophy to me is the accumulation and arrangement of facts that are known to be true, and in Dr. Barclay's paper he has epitomized an enormous field. This one expression —"life"—means to me, the force which actuates, animates and moves the human body. We call it vitality. It is the force by which the func-

tion of every organ is performed, every muscular motion is made, and every thought is gauged. We do not have such a thing as attributes of the mind. The mind moves; it moves in the direction of philosophy; it moves in the direction of mathematics. The mind moves like the body moves, and it is moved by precisely the same force. Philosophy, as described in the paper, means a knowledge of this force or power; and disease means this force deflected or abnormally resisted, or it is obstructed; and when this philosophy is well fixed in our minds, there is no difficulty in reaching logical conclusions as to the causation of disease, or in other words, the liberation of potential energy under abnormal conditions and rendering it kinetic to the detriment of the human organism.

There is no difficulty in condemning a man who will place a young girl of twelve or fourteen years of age upon a table and commit a mechanical rape. The physician should find out what is the matter with the girl who is not functionating properly. There is no difficulty in changing the nutrition of a patient, and then direct the life force in its normal channels and along normal routes. The majority of our difficulties arise from not understanding the problem of nutrition. The majority of all human beings to-day are literally crowded toward death with food, consequently the vital force of the body is thrown out of tune and harmony because it has to take care of this surplusage in order to prevent further obstruction in the functioning of organs, and to philosophize in medicine is to me as much, in fact, a great deal more, than to follow that which is pure speculation, yet from speculation we learn to philosophize.

DR. BARCLAY (closing the discussion).—I only regret that I did not have sufficient time to read the entire paper. I do not see any material difference in the definition of Dr. Buchman, or in his comprehension of the subject, than my own. I suggested at the outset that the subject was more comprehensive than I had thought when I selected it. I even thought of choosing another subject; but appendicitis, diphtheria, typhoid fever, etc., are subjects that have been so thoroughly discussed at almost every medical meeting, that I thought I would take up a new line of thought, and if I failed it has been an honest effort. I have done the best I could to place the profession of medicine where I believed it ought to be placed, so that it will command the confidence and respect of the world.

The greatest evils of to-day in the profession of medicine are its unworthy members. Every man who assumes to heal the sick (I do not care what he does, whether he be a chiropodist or anything else, a faith healer), he is called a doctor. He may not have studied the science of medicine in his life. He may not be able to define anatomy or physiology, yet he is termed a doctor. I was never more deeply impressed than by one of these traveling-men who had never studied medicine, when he unloaded his pockets and said to me in my own office, "I want to show you that I use powerful medicines." He had aconite; he had fluid extract of poke-root, and some of the most active poisons. He used them. I said to him, "Are you not afraid to use these drugs?" He replied, "Not a bit of it. I come in and cure where you fellows fail." That is largely true. I said to him, "I remember a case in which you succeeded where I had failed. Now, Doctor (as I designated him as such), I want to know what was wrong with that boy? I gave him iron and various tonics." He replied, "I am glad you asked that question. None of you fellows found out. It was a pure case of masturbation." He did not use that term. I asked him what treatment he used, and he said that he took some croton oil and applied it effectually to that part of the anatomy, making it so sensitive and sore that the boy left off the habit. Now, this man was regarded as a greater man in the community than those who had been educated in better schools and colleges.

XXXVII.—INFANTILE MALARIA.

BY WILLIAM BRITT BURNS, M. D.

DECKERVILLE, ARK.

Of the many phases of malaria there be none which calls for more careful scrutiny, unerring judgment and unstinted application in its treatment than malaria in the infant.

Heredity: The question of heredity has been little considered; by analogy there seems to be no good reason to controvert the idea of transmission of the malarial parasite through the placental circulation. Germs proper to diseases, such as charbon, chicken cholera, septicemia, etc., have been demonstrated in the embryos of animals dead of these respec-

tive diseases. The typhoid bacillus was found in the lungs, spleen, kidneys and mesenteric glands of a child five days old, the offspring of a mother who had contracted typhoid fever in the eighth month of pregnancy. Transmission of syphilis is assumed as obtaining through the placental circulation. There may be many others. Though necropsies of several fetuses from infected mothers have negatived the presumption of hereditary malaria, a positive conclusion is still not a violent one.

Susceptibility: The greater liability of the child to get malaria, becomes a question of easy solution when mosquito-inoculation is accepted; and the period and time of exposure are contemporaneous with the exposure of the adult. The child is first put to bed and is the first to sleep; the arms and legs and may be half of the body are bare; the skin is delicate and tender, and as compared with the adult, clean, the exhalations from this organ lack the odor emanating from that of the adult. The adult does not retire until the mosquitoes have filled themselves from the blood of their children; they are better protected by clothing, shoes, etc., and by avoiding the bite of these insects, which the infant does not often think to do. Their skins are rougher and tougher and less vulnerable, and further repel mosquitoes by the odor given off.

After the entrance into the blood current the susceptibility is still greater in the infant. The corpuscles upon which the plasmodia feed, offer less resistance; more of these bodies are destroyed, comparatively, at each paroxysm, than in the adult, consequently more toxins liberated. Just here is the danger; the grave nervous symptoms the malariologist so often sees are liable to appear.

Do not allow the infant to have a second or third paroxysm.

How often has one been called to see a child in spasms. May be one will get a history of: "A little fretful Friday—did not stop play—Saturday apparently well, till afternoon; there was a little nausea; no appetite, after which slept till supper or slightly restless at night calling for water." Sunday afternoon (when one is called)—chill—fever, convulsions—death

—for this is the usual sequence when a white child has malarial convulsions. Not so with the negro; malarial convulsions in the negro baby are rare and it is my observation that they get well. The strong degree of immunity of the negro race, obtains in the infant.

It is the duty of the physician to carefully instill into the minds of parents the grave importance of noting the little indispositions, of whatever nature, of the infant in a malarial region. A child does not cry and fret, does not refuse to nurse or eat, does not get nauseated or become restless at night, will not stop play for nothing. The mothers in the bottoms soon learn this. Eternal vigilance here, is the price of liberty.

There is no disease which may reach alarming proportions in children so stealthily as that of malaria—yet so surely raises the danger signal, if one has been observant.

We are to look for fretfulness, nausea, vomiting, stomachache, diarrhea, dysentery, epistaxis, excessive or scant urinary flow, drowsiness, fetid breath, coated tongue, headache, backache, feverishness and fever, etc. Any one or most of these symptoms may be present in a mild degree one day, slightly more severe the next day—the third day (or even the second day) the blood is supersaturated with toxins, the nervous system is overwhelmed, pupillary manifestations appear—one pupil dilated, the other contracted, often both are contracted—the extremities are in clonic convulsions, the jaws are clenched, unconsciousness comes on apace. This is the condition generally known as "congestion" from which so many babies die in the river bottoms of the south. Indeed, there is a general congestion, the most prominent symptoms may direct in one instance to the brain, in another to the liver and in still another to the stomach. The convulsions may be reflex in their nature, the point of irritation which predetermines the flow of blood to a given organ or part being large accumulations of malarial pigment, dead parasites and debris, often occluding large vessels and lymph spaces.

Accumulations of malarial pigment and dead parasites occur

in the mucous membrane of the stomach and intestines, liver, spleen, kidneys and brain. At sporulation, toxins and other residual matter are liberated and as Manson suggests, probably a hemoglobin solvent, which may be the pyrogenetic agent, all hitherto, either contained in the body of the parasite or in the infected corpuscle, these combining to overwhelm the nervous system early, in infantile malaria.

In this connection attention may be called to the alternate days of insufficient protection in the question of immunity. The physiologists tell us that the physiological rhythm of the human body is diurnal; at this period there is an increased immunizing power of the blood—of all the protective forces of the body indeed, as night follows the day, so also is a highly protected period followed by one of less protection. At this latter period the parasite meets with but little resistance, more of them reach sporulation, a paroxysm falling on one of these days would tend to come in an aggravated form. We are thus taught not only to prognosticate a large multiplication of parasites at each successive paroxysm, but to expect on alternate days a rhythmically insufficiently protected period. Often one sees families who have had born to them five, six and even ten children and only one, two or three of these live to cheer and brighten these homes, and in each instance one is told that all of these little ones perished with so-called malarial congestion.

However, not all children suffer with acute malaria: a good percentage of them have chronic malaria—cachexia; one or two mild chills; quinine administered in mild doses just sufficient to prevent the next explosion, then given indifferently or not at all. The child goes on with considerable blood destruction, accumulating pigment, bile and malarial, their little skins take on a bronzed appearance, thickened and dry as parchment; soon the spleen fills up and may be felt from two inches below the ribs to as low down as the iliac fossa, sometimes reaching across to the opposite side; its pressure upward on the diaphragm, with the pain which is often centered in the upper part of the organ simulates, and the parents are often appre-

hensive of pneumonia. The liver is more or less to be felt below the costal margins. Sometimes there are black tarry stools, but more often these are clay colored. There may be constipation, the rule, however, seems to tend toward a looseness, the color in this latter condition is that well known of "milk gravy."

The urine is scant and scalding, highly colored and heavily loaded with solids; occasionally there is a flow of clear (water colored) urine. This may be regarded as a manifestation of active malaria, and generally presages a paroxysm—however mild it may be, followed by only a little back or leg pain, the plasmodia may be successfully sought in the peripheral blood. The tongue is large and flabby, indented by the teeth, with a whitish cast; this, as are also the gums, is pale—anemic.

Moncorvo believes that infants and children so infected are physically, mentally and morally deteriorated. He places malaria beside syphilis and tuberculosis as a retarder of physical growth. Every malariologist will attest that in the tropics and sub-tropics in the treatment of any disease he has a malarial base to work upon, even in wounds which confine to the bed or room, malaria is precipitated. My experience fully accords with that of Moncorvo. It requires no stretch of the imagination to say what three or four generations of these little bronze fellows will bring. It becomes quite a social problem, when our most fertile lands are so poorly habitable on account of this infection.

What is the therapy of malaria? Every one knows how to treat chills and fever. Alas! it is that character of knowledge, of which it is said: A little is a dangerous thing.

Prophylaxis: First, I accept with all of the avidity of Grassi, and desire to emphasize with all the earnestness of Manson, Ross and Sambon, the "mosquito-malaria" theory.

There is no longer any room for doubt or speculation in the matter. The whole ground has been gone over again and again, in the past two years; marsh-water; marsh-mud; marsh-air; drinking water, water laden with the carcasses of mosquitoes and divers others, all have been carefully analyzed

and cultures have been made by most competent and trustworthy men, men who are seeking the truth for the truth's sake. Even water containing the carcasses of infected mosquitoes has been drunk—in a number of instances; the dust of dried puddles has been tried in culture, all of these have yielded negative results.

Professor Grassi has considered the subject of such vast importance that he has given sixteen hours the day for the past two years to its study. Dr. Luigi Sambon and Dr. C. G. Low are just now finishing the malaria season in the Roman Campagna near Ostia, a place so infested by malaria that no one who spends the night there under ordinary conditions escapes the effect of the poison. In their mosquito proof shack, neither they, Signor Terzi, who was with them, nor their servants were infected. They took no quinine, neither any anti-malarial. They went in at twilight and remained in until the sun was well up.

Professor Grassi has carried a colony of ten railwaymen's houses and two railway stations situated upon a stretch of twelve kilometers of railway, through the malarial season. In these houses there were 104 persons of whom 35 were children; with the exception of three *recidivists* who took no quinine in the winter season, the whole 104 persons were up to October 1 free of any malarious infection. The first thing done was to cure all cases of ague during the "dead season" or non-malarial season—January to June, by eliminating the parasites with quinine. Close wire netting was placed over the windows and doors, these otherwise being left open to the air. By sun-down every subject was in doors, *anopheles* do not stir until that time. Men who had night duties, were provided with thick cotton gloves, and a veil which was attached closely to their hats. On examining *anopheles* captured here, it was found that one per cent. of them were infected. Grassi himself, besides devising the experiment, remained three nights a week on the spot.

Dr. Mattei under the auspices of the Colonial Office conducted a similar experiment at Valsavoia, a highly malarious

spot, an hour's rail from Catania in Sicily; where four healthy wharf laborers were taken from Catania every evening at 5:30 for three days, returning on the next morning's train at 7:30. These men were ordinary laborers, ill-fed and hard worked, no change was made in their diet, and they slept in the mosquito proof room improvised for them upon straw for the first part of the experiment, beds being delayed in reaching Valsavoia. Malaria at the time was rife at Valsavoia and mosquitoes so numerous that the men had to whirl open umbrellas about their heads to avoid being bitten, and to clear a lane through the host of their assailants. Care was used to see that no mosquito entered the room with the men. During these thirty-three days and for six months subsequently the men remained quite healthy.

Instances of this kind might be multiplied many times. Instances of inoculation experiments likewise have been manifold and successful. One very prominent and at the same time striking instance is the case of Dr. Manson's son, who has never been in a malarious region; he was bitten by mosquitoes, infected in Italy and prepared and shipped in proper netting covered cases, under the personal superintendence of Dr. Bastianelli and Dr. Sambon. In the proper course of time young Manson had manifestations of malaria—fever and sweat—and blood smears showing benign tertians, exactly the variety of parasites fed to the mosquitoes.

Bellevue Hospital, New York, reports a similar case.

Thayer, McCollum, Woldert and Berkeley have all done valuable work in this line.

This summer I have found characteristic bodies in the stomach walls of *anopheles quadrimaculatus Say,* captured in the rooms of persons sick with estivo-autumnal malaria. On the other hand, mosquitoes captured in out houses have not shown infection.

Those whom I have persuaded to use netting over windows and beds have largely avoided ague. In the seasons of 1898-9 I was myself, decidedly inoculated, having six or eight chills in '98 and four in '99, leaving a mild cachexia; those years

I only used netting over windows and doors. This year I added a bar to my bed and I have had only an occasional leg ache. This I have regarded as manifestation of relapsing malaria and have taken probably less than three grains of quinine, the week.

Children, then, should be kept in doors after sundown, their beds should be protected by a close mosquito bar; and all doors and windows covered with fine wire netting. An effort should be made to banish the parasite from the blood during the winter and spring, and being safeguarded from anopholes they will not get fresh infection in the malarial season.

In the attack, the glandular system should be aroused and sufficient quinine got into the blood to prevent a second chill.

Pernicious chills require heroic treatment and should be met promptly by large doses of quinine hypodermatically. The necessity for a good liver arousement is here very urgent. For the spasms, chloral-hydrate or bromid of potash, either or both, may be used, it will be found that these will be often vomited; a hot mustard bath or a hot normal salt enema may be of value.

For cachexia quinine in sufficient doses and tonics for forty days.

XXXVIII.—DETERMINATION OF SEX.

BY W. O'NEAL MENDENHALL, M. D.

RICHMOND, IND.

Statistics show that about thirty-two million births occur every year, and it would be nearly correct to say sixteen million boys and sixteen million girls, and yet it is astonishing to know with what perfect ignorance this apportionment is kept so nearly equal. The authors of our standard works have maintained a perfect silence upon this, as they have written upon the functions of the reproductive organs, and yet, I believe the determining of the sex is under as perfect a law as is the

loosened apple that falls to the ground, under the law of gravitation.

Every accoucheur has heard the expression of regret as the sex of the newly born was made known. There is an oft repeated tale of an Indian chief who ardently desired a boy to succeed to his honors. At the close of the confinement he said, with drooping head and saddened tone, "She-boy again," thus, it is said, was named the city of Sheboygan. This old Indian has had many sympathizers. Kings have lamented that sons were not born to inherit their kingdoms, large families of boys have been born to parents where girls were desired, and the same dissatisfaction has existed where an army of girls have been the progeny.

Many articles have been written discussing this subject, in different journals. Some contain intelligent suggestions, but others seem very unscientific. One argues that the sex is determined entirely by the male; another that it is by the female alone; one that one male member produces the male, and the other the female, and that if one of the male members be taken away, there can be but one sex produced. One maintains that if the act of copulation be not completed by the female, no conception can take place, all of which is unscientific and unintelligent.

About the time of the maturing of the ovum, the Graafian follicle bursts and the ovum enters into a journey through the Fallopian tubes to the uterus, to develop if impregnated, or to be cast off if not impregnated. Impregnation may take place on the surface of the ovary, in the tube, or in the uterus itself; most frequently it takes place on the surface of the ovary or in the tube. The strong affinity between the ovum and the seminal body causes the vitellus to rise to meet the latter as it penetrates the zona. The head of the male element buries itself in the hillock, leaving its tail, which up to this time has been a very important factor as a locomotor element, but which is now no longer needed. The head immediately becomes the center of a new grouping of the vitelline molecule. While these were all previously arranged in the one star around the

maternal pronucleus, a part of them now form a star around the paternal pronucleus, or head of the spermatozoön. Eventually the attraction between the pronuclei results in a fusion of the two into one nucleus. At the ripening and bursting of a Graafian follicle the ovum is born, and full of vitality and energy starts on its journey of life, which is to last until it has traversed the entire length of the Fallopian tube, entered the cavity of the uterus, slipped slowly down its inner wall and reached the mouth, when its energy and life being spent, it dies of old age and is cast off. Again, the paternal pronucleus or spermatazoön is born into an existence, full of energy and quickened with zeal. It is deposited in the vagina, around or upon the mouth of the uterus, and at once starts upon its journey through life, passing through the neck, climbing the uterine wall, entering the Fallopian tube, traveling its entire length, at the extremity of which it dies of old age and is cast off. Why these two births? Why these two journeys through so short a life? Simply that the maternal pronucleus may clasp in its embrace the spermatazoön, or that the spermatazoön may find and be swallowed up by the desire of the ovum, making of the twain one new existence, the first nucleus of the future human being.

But what determines the sex is the question I desire to answer, after thus preparing the way. When the act of coition is completed soon after the menstrual flow, the spermatazoön will have to travel almost its entire journey of life before it will find the maternal pronucleus, which it does at or near the Graafian follicle, where the ovum is just ripened, just being liberated for its work of life and being fresh and full of vitality, it grasps that already weakened and aged spermatazoön, enters into new relationship and determines the sex. Again, when the carnal union of the sexes does not take place until from six to nine days after the menstrual flow, the maternal pronucleus has this journey of life to perform, and exhausted by travel and weakened by age, it is found by that newly born, vigorous spermatazoön and that new relationship is again entered into, and the sex is determined by the paternal pronucleus.

Therefore; if this vitalizing union takes place soon after menstruation, a female is likely to result; but should it not occur until from six to nine days after, a male will be produced —all other things being equal, of course.

Do not understand me to say that this law was established by the Medes and Persians, or that when it was said, "Let us make man," that with that the decree was spoken that no pathological condition should ever change this law. The loosened apple will not fall to the ground if the projecting roof should break the law.

MINUTES MISSISSIPPI VALLEY MEDICAL ASSOCIATION.

Proceedings of the Twenty-Sixth Annual Meeting, held at Asheville, North Carolina, October 9, 10 and 11, 1900.

FIRST DAY—*Morning Session.*

The Asociation met at the Battery Park Hotel, and was called to order at 10 a. m. by Dr. M. H. Fletcher, chairman of the Committee on Arrangements.

Prayer was offered by Rev. R. F. Campbell.

Two addresses of welcome were delivered, one on behalf of the city and state by Hon. Theodore F. Davidson, the other on behalf of the local profession by Dr. John Hey Williams.

Dr. Fletcher then introduced the president of the Association, Dr. Harold N. Moyer, of Chicago, who responded briefly to the address of welcome.

Dr. Fletcher made the following report as chairman of the Committee of Arrangements:

REPORT OF COMMITTEE OF ARRANGEMENTS.

The meetings of the general and regular sessions will be held in the ballroom of the Battery Park Hotel. A general smoker will be held in the Casino attached to the Swannanoa Hotel. Dr. Minor's smoker will be held at his residence. The reception of Dr. Burroughs will be at his residence. The ladies' street-car excursion will start from the city square at 11:30 Wednesday morning, and will be interrupted by a lunch tendered by the proprietor of the Manor. The carriages for the drive to the Vanderbilt estate will start from the Battery Park Hotel at 3 p. m. Wednesday. Cards and invitations must be shown to entitle one to a place. The promenade concert and dance will be held in the palm room of the hotel and in the ballroom. The ladies' drive Thursday a. m. will start from the Battery Park Hotel and will include a reception at the house of the Swannanoa Golf Club. The ladies'

card party will take place Thursday p. m. in the parlor of the Battery Park Hotel. Those taking part in the ride over the crest of the Blue Ridge on Friday a. m. will take the street cars to the depot where cars will be awaiting them.

The next order of business was the report of the secretary, Dr. Tuley, which was read as follows:

REPORT OF THE SECRETARY.

MR. PRESIDENT AND GENTLEMEN: The Association has in our opinion never been in a more prosperous condition, which is due in the greater part, we think, to the progressiveness of your Executive Committee. This is decidedly a commendation of one of the fundamental principles of the Association, the makeup of this Committee, it being composed of its ex-presidents. We would call your attention to the advances made in the past three years; the adoption of a Constitution and By-Laws; making the membership in the Association dependent upon annual payment of dues, failure to pay for two years forfeiting membership; the publication of a volume of Transactions of the last meeting in Chicago, the first in the history of the Association; the adoption of a seal or emblem, which is to appear upon each publication of the Association.

We offer a program full of papers by workers in the profession, and call special attention to the publication of a short abstract of the paper following its announcement. We feel sure this will meet with the full approval of everyone.

It was a great source of disappointment that we failed to obtain a concurrence from the Central and Western Passenger Associations in the very generous one fare rate granted by the South Eastern Passenger Association. We feel the thanks of the Association is due the Southern Railway officials for their many acts of courtesy, especially Mr. W. H. Tayloe, A. G. P. A., whose services have been invaluable in the great amount of correspondence incident to the attempt to influence the other passenger associations. Respectfully submitted,

HENRY E. TULEY.
Secretary.

On motion of Dr. T. H. Stucky, of Louisville, the report was received and referred to the Publication Committee.

Dr. Dudley S. Reynolds, of Louisville, Kentucky, then read his report as Treasurer. It is as follows:

REPORT OF THE TREASURER.

Mr. President: Your Treasurer has the honor to report that, there were in the Treasury at last report, October 3, 1899 ..... $ 133 96

	Dr.	Cr.
Received at last meeting	942 00	
Received from Secretary since last meeting	225 40	
Total	$1301 36	
Disbursements as per vouchers attached		$1259 97
Balance in the Treasury October 8, 1900		41 39
		$1301 36

All of which is most respectfully submitted

DUDLEY S. REYNOLDS,
Treasurer.

It was moved and seconded that the report be received and referred to the Publication Committee. Carried.

The report of the Committee on Publication was read by Secretary Tuley, as follows:

REPORT OF COMMITTEE ON PUBLICATION.

Your committee on Publication begs leave to present the volume of the 1899 meeting as part of its report.

The Committee advertised the work with the following results: S. D. Childs & Co., Chicago, $2.25 per page; Frank Nunemacher, Louisville, $1.84; John P. Morton & Co., Louisville, $1.59; Dornan, Philadelphia, $1.56; W. B. Conkey & Co., Chicago, $1.56; Chas. Wood Fassett, St. Joseph, Mo., $1.50; Geo. C. Fetter, Louisville, $1.48; Donohue & Henneberry, Chicago, $1.36; Courier-Journal Job Printing Co., Louisville, $1.30.

The work was awarded the Courier-Journal Job Printing Company. Seven hundred copies were printed and in the hands of the members by February 15, less than four months after the meeting.

In justification for the choice made in the color of the cover, the Committee offers the following explanation, as the only criticism of the volume which was received was upon the color. It was felt that a durable color, unused by any other Association would individualize our Association's volume, which could not be accomplished by any other method of identification. We would suggest that instructions be given the next Committee on Publication that they may be guided as to future volumes. No list of members was published be-

cause of the chaotic state of the roll and the large number of members to be reported to the Executive Committee as delinquent two years. A complete list will be published in subsequent volumes. Respectfully submitted,

HENRY E. TULEY, Chairman.
L. S. MCMURTRY,
DUDLEY S. REYNOLDS.

On motion the report was received and placed on file.

The report of the Executive Committee was read by Dr. W. N. Wishard, of Indianapolis, as follows:

REPORT OF THE EXECUTIVE COMMITTEE.

Mr. President and Gentlemen:

Your Executive Committee met last night and instructed me to make the following report:

1. The financial reports of the Secretary and Treasurer have been audited and found correct.

2. The Secretary has been directed to dispose of as many copies of last year's Transactions to new members as possible, at one dollar and twenty cents per volume, and if all of the volumes are not disposed of in this way he is given discretionary authoritv as to the donation of the remainder to the American Medical Library Association.

3. The Secretary has reported the names of members delinquent in payment of dues for the past two years. Under the Constitution these delinquents must be dropped from the roll of membership of this Association. While the Executive Committee has no authority to continue their names upon the roll, it has endeavored to retain them by directing the Secretary to address a letter to each one urging the immediate payment of back dues and fixing December 1, 1900, as the limit in which payment can be accepted and permanent membership retained. It is the sense of the Committee that the value of permanent membership in this Association can only obtain its proper recognition by obeying the Constitutional provision in reference to the payment of dues.

4. Your Commttee wishes to express its high appreciation of the work of Dr. Henry E. Tuley, the Secretary of this Association, and especially to commend the work he and the Publication Committee have done in compiling the valuable volume of transactions of last year's meeting. The Committee also

wishes to express its appreciation of the efficient manner in which the Treasurer has performed his duties.

Respectfully submitted,
W. N. WISHARD, Chairman.

On motion of Dr. H. O. Walker the report was adopted.

Under the head of miscellaneous business the Secretary asked that some action be taken by the Association in regard to his recommendation as to the permanent color for the annual volume of Transactions.

Dr. T. H. Stucky moved that royal purple be accepted as the permanent color for the volume of Transactions. Carried.

At this juncture Dr. A. H. Cordier, of Kansas City, First Vice-President, took the Chair, and Dr. Moyer delivered his address as President.

On motion of Dr. Dudley S. Reynolds, the address was referred to the Committee on Publication.

The reading of papers was now taken up, the first one being read by Dr. H. O. Walker, of Detroit, Michigan, who selected for his subject, "Vaginal *Versus* Abdominal Hysterectomy."

Dr. R. Stansbury Sutton, of Pittsburg, Pennsylvania, contributed a paper on "Cancer of the Uterus and its Treatment," which was read by the Secretary in the absence of the author.

These two papers were discussed conjointly, the discussion being opened by Dr. E. W. Lee, and continued by Drs. Palmer, Bovee, Cordier, Cowing, Barclay, and the discussion closed by Dr. Walker.

Dr. A. H. Cordier, of Kansas City, Missouri, read a paper on "Post-Operative Internal Hemorrhage," which was discussed by Drs. Walker, Lee, Palmer, Andersen, Jelks, and the discussion closed by the essayist.

On motion, the Association adjourned until 2:30 p. m.

FIRST DAY—*Afternoon Session.*

The Association reassembled, pursuant to adjournment, and was called to order by the President.

Dr. George W. Cale, Jr., of Springfield, Mo., read a paper entitled "A Case of Intermittent Hydrops of the Knee," which was discussed by Dr. Lee, and the discussion closed by the essayist.

Dr. B. Brindley Eads, of Chicago, read a paper entitled "Ventral Hernia Following Laparotomy."

Discussed by Drs. Walker, Lee, Bovee, Moyer, and the discussion closed by the author of the paper.

Dr. E. H. Richardson, of Atlanta, Ga., read a paper entitled "Perfect Recovery Following Gangrene of the Scrotum and Penis."

Dr. Henry P. Newman, of Chicago, followed with a paper on "Trachetoplasty."

The paper was discussed by Dr. Taylor, and, in closing, by the essayist.

On motion the Association adjourned until 7:30 p. m.

FIRST DAY—*Evening Session.*

The Association reassembled at 7:30 p. m., and was called to order by the President.

Dr. O. J. Stein, of Chicago, read a paper on "Middle Ear Disease in its Relation to the Cranial Cavity." In connection with the paper Dr. J. Holinger, of Chicago, gave an admirable stereopticon demonstration.

The paper was discussed by Drs. J. A. Stucky, Andersen, Moyer, Bates, Lanphear, and the discussion closed by Dr. Stein.

On motion the Association then adjourned until Wednesday, 9:30 a. m.

SECOND DAY—*Morning Session.*

The Association met at 9:30 a. m. and was called to order by the President.

The address in medicine was delivered by Dr. I. N. Love, of New York City. He selected for his subject "Nutrition and Stimulation."

At the conclusion of the address Dr. H. O. Walker, of Detroit, offered the following preamble and resolution:

WHEREAS, Dr. I. N. Love, a former President of the Mississippi Valley Medical Association, has removed his residence from St. Louis to New York City: therefore be it

Resolved, That we, the members of this Association, extend to him the hearty wish that success in his new field of labor attend him, and that his membership in this Association be continued, that we may in the future, as in the past, be aided by his presence and wise counsel.

On motion of Dr. Joseph M. Mathews, the resolution was adopted by a rising vote.

Dr. John L. Jelks of Memphis, Tenn., read a paper on "Treatment of Perirectal Abscesses."

Dr. J. Rawson Pennington, of Chicago, followed with a contribution entitled "Simple Operation for Hemorrhoids: Enucleation."

Dr. Sterling B. Taylor, of Columbus, Ohio, read a paper on "Obstipation."

These three papers were discussed jointly. The discussion was opened by Dr. Joseph M. Mathews, and continued by Drs. Parker, Lee, Cowing, Cordier, Walker, Johnson, and the discussion closed by the essayists.

The Secretary announced the names of the Nominating Committee, as follows:

NOMINATION COMMITTEE.

ARKANSAS.....Dr. S. P. Collings, chairman.
ALABAMA.....J. W. Knowlton.
CONNECTICUT.....Thomas D. Crothers.
DISTRICT OF COLUMBIA.....J. Wesley Bovee,
GEORGIA.....E. H. Richardson.
ILLINOIS.....Otto J. Stein.
INDIANA.....Wm. N. Wishard.
IOWA.....N. McKitterick.
KENTUCKY.....Dudley S. Reynolds.
MISSOURI.....Geo. W. Cale, Jr.
MASSACHUSETTS.....J. B. Learned.
MICHIGAN.....H. O. Walker.
MISSISSIPPI.....Lea Orr Carruth.
MINNESOTA.....W. Stuart Leech.
NEW YORK.....I. N. Love.
NORTH CAROLINA.....L. B. McBrayer.
OHIO.....J. C. Culbertson.
PENNSYLVANIA.....Edwin Rosenthal.

SOUTH CAROLINA.. .....C. F McGahan.
SOUTH DAKOTA.....H. Holmgren.
TENNESSEE.....John L. Jelks,

The report of the Committee on Credentials was to be read at this time, when a motion was made and carried that the report be adopted without being read.

The Committee on Credentials report favorably upon the following applicants for membership in the Association:

S. S. Watkins .....Owensboro, Ky.
Lea Orr Carruth.....Chesterville, Miss.
John Hey Williams.....Asheville, N. C.
Julius Franklin Perry.....Asheville, N. C.
G. W. Reed.....Biltmore, N. C.
Wm. S. Walker .....LaFayette, Ind.
J. Howell Way.....Waynesville, N. C.
H. R. Weyant.....Philadelphia, Pa.
S. Lewis Summers.....Philadelphia, Pa.
John H. Lock.....Philadelphia, Pa.
N. McKitterick.....Burlington, Ia.
B. H. Payne.....Fort Wayne, Ind.
J. F. Hobson.....Cleveland, O.
Willard P. Whittington.....Asheville, N. C.
Henry M. Skillman.....Lexington, Ky.
Chas. L. Pearson.....Asheville, N. C.
Henry C. Whelchel.....Dahlonega, Ga.
M. N. Stow.....Dahlonega, Ga.
Joseph Thomas Sevier.....Asheville, N. C.
Chauncey D. Palmer.....Cincinnati, O.
W. Stuart Leech.....Foley, Minn.
Chas. S. Jordan.....Asheville, N. C.
S. Westray Battle.....Asheville, N. C.
James Sawyer.....Asheville, N. C.
W. H. Bates .....New York City.
B. Brindley Eads.....Chicago, Ill.
Thomas D. Crothers.....Hartford, Conn.
Karl von Ruck.....Asheville, N. C.
W. C. Brownson.....Asheville, N. C.
Charles P. Edwards.....Bald Creek, N. C.
R. B. Epting.....Greenwood, S. C.
Rob't. L. Davis.....Bryson City, N. C.
D. R. Bryson.....Bryson City, N. C.
Edwin Rosenthal .....Philadelphia, Pa.
J. H. Stealy .....Freeport, Ill.
H. Bascom Weaver.....Asheville, N. C.
A. A. Simons.....Coverport, Ky.
E. E. Klutz.....Troutmans, N. C.

Thos. S. Faucette .... Burlington, N. C.
J. Lively Johnson.....Louisville, Ky.
Lawrence E. Holmes.....Biltmore, N. C.
John R. Ray.....Burnsville, N. C.
D. A. Stanton.....High Point, N. C.
E. P. West..... Clarkesville, Ga.
R. J. Teague.....Roxboro, N. C.
W. H. Briggs..... ....New Haven, Ct.
A. M. Phelps.....New York City.
M. L. Heidingsfeld..... Cincinnati, O.

On motion the Association adjourned until Thursday morning, 9:30 o'clock.

NOTE.—No afternoon session was held on this day, for the reason that the members of the Association and guests took a drive to Biltmore, the Vanderbilt estate.

THIRD DAY—*Morning Session.*

The Association met at 9:30 a. m., and was called to order by the President.

Dr. Alexander C. Wiener, of Chicago, read a paper entitled "Treatment of Tuberculosis of the Spine," which was discussed by Dr. Holinger, and, in closing, by Dr. Wiener.

Dr. H. H. Grant, of Louisville, Kentucky, read a paper entitled "Medical and Surgical Treatment of Acute and Chronic Cervical Lymph Nodes."

This paper was discussed by Drs. McGahan, Holinger, Wheaton, Reynolds, Buchman, and the discussion closed by the essayist.

The President appointed as Committee on Publication Drs. Henry E. Tuley, chairman, Dudley S. Reynolds, and Lewis S. McMurtry, all of Louisville.

The Secretary read a letter from Dr. Coronado, inviting the members of the Association to visit Havana during the meeting of the Pan-American Medical Congress, December 26-28.

The address in surgery was then delivered by Dr. Charles A. Wheaton, of St. Paul, Minn. He chose for his topic "Fulminating Appendicitis."

On motion a vote of thanks was extended to Dr. Wheaton for his excellent address.

Dr. Carl H. Andersen addressed the Association on the subject of "Medullary Cocainization."

The subject was discussed by Drs. Moyer, Newman, Lanphear, Cordier, and, in closing, by Dr. Andersen.

The Secretary read the following names of delegates appointed to attend the Pan-American Medical Congress, to be held in Havana, Cuba.

Emory Lanphear, St. Louis; T. D. Crothers, Hartford, Ct.; H. N. Moyer, Chicago; C. A. Wheaton, St. Paul, Minn.; J. Howell Way, Waynesville, N. C.

Dr. A. M. Phelps, of New York City, read a paper on "Treatment of Tubercular and Purulent Hip Joint Diseases, with Large Speculum Drainage, and Pure Carbolic Acid."

This paper was discussed by Drs. Norbury, Wiener, Andersen, J. A. Stucky, and, in closing, by the essayist.

The Secretary read the report of the Nominating Committee, as follows:

REPORT OF NOMINATING COMMITTEE.

The Nominating Committee makes the following as its unanimous report:

President—A. H. Cordier, Kansas City, Mo.

First Vice-President—C. F. McGahan, Aiken, S. C.

Second Vice-President—Charles L. Minor, Asheville, N. C.

Secretary—Henry E. Tuley, Louisville, Ky.

Treasurer—Dudley S. Reynolds, Louisville, Ky.

Chairman of the Committee of Arrangements—J. C. Culbertson, Cincinnati, O.

Next Place of Meeting—Put-in-Bay, Ohio.

Time of Meeting—September, 1901.

On motion of Dr. Andersen the report was adopted.

The Secretary read a further report by the Executive Committee, which, on motion, was adopted.

Meeting of the Executive Committee, morning of Oct. 11. Dr. W. N. Wishard in the chair. Following were present: Doctors Wishard, Love, Reynolds, Mathews, Cordier, Collings, Stucky, and, by invitation, Mr. McCrary, manager of the Put-in-Bay Hotel.

The Committee decided that the usual course be followed as to controlling the revenues incident to the meeting, accruing from the exhibitors. A rate was accepted of $3.00 per day, with 50 cents additional for room with bath. It was decided that no arrangements be made which will detract from the scientific program, the days being given to science and the evenings to amusement. The 10th, 11th and 12th of September were the days chosen for the time of meeting. All money accruing from advertisements in the program were conceded to Mr. McCrary, he assuming all of the expense of its printing, no advertisement being received without passing the scrutiny of Dr. J. C. Culbertson, chairman of the Committee of Arrangements. The amount of rental for exhibitors' space, and other details of entertainment and expenditure of moneys is left to the chairman of the Committee of Arrangements.

It was decided that a record of the minutes be given to Mr. McCrary as a notice of the acceptance of dates named for time of meeting.

It was decided that the Committee of Arrangements be composed of one member of the profession from each of the large cities continguous to Put-in-Bay, viz., Detroit, Cleveland, Toledo, Sandusky.

On motion the Association adjourned until 2:30 p. m.

THIRD DAY—*Afternoon Session.*

The Association reassembled at 2:30 p. m., with the President in the Chair.

The Committee on Credentials made the following report:

The Committee on Credentials recommends the following for membership in the Association:

G. S. Ellis.....Helena, Ark.
Richard Herbert Cramer.....New Cumberland, W. Va.
J. Hollnger.....Chicago, Ill.
E. H. Richardson.....Atlanta, Ga.
Andrew B. Drafts.....Hendersonville, N. C.
Thomas P. Cheesborough.....Asheville, N. C.
Edgar A. Hines.....Seneca, S. C.
W. M. Richardson.....La Tour, Ark.
James L. Edgerton.....Hendersonville, S. C.
James Marion Glass.....Asheville, N. C.
Hugh. A. Cowing.....Muncie, Ind.
G. W. McCaskey.....Fort Wayne, Ind.

G. C. G. Givan.....Harriman, Tenn.
Earle Grady.....Tryon, N. C.
Carl H. Andersen.....Chicago, Ill.
Geo. Pressly Neil.....Greenwood, S. C.
Francis Drake Kendall.....Columbia, S. C.
George Calvin Erwin.....Young Harris, Ga.
J. C. Campbell .....Denmark, N. C.
Edmund B. Webb.....Andrews, N. C.
Clyde E. Cotton.....Cleveland, O.
J. E. Drake.....Lyceum, Tenn.
W. J. Weaver.....Marshall, N. C.
White G. Owen.....White Castle, La.
Darwin D. Eads. .....Chicago, Ill.
Davis Freeman.....Greenville, S. C.
G. W. Purefoy.....Asheville, N. C.
John H. Woodcock.....Asheville, N. C.

Dr. Frank P. Norbury, of Jacksonville, Illinois, read a paper on "Pulmonary Tuberculosis in Infancy and Childhood," which was discussed by Drs. Stein, Taylor, Rosenthal, and Paquin.

INDUCTION OF THE PRESIDENT-ELECT INTO OFFICE.

The retiring President, Dr. Moyer, said: All good things come to an end. It was my intention to have resigned this morning, but a combination of fortuitous circumstances compelled me to occupy the Chair until this afternoon. I wish, however, before resigning my office, to thank you individually and collectively for having supported me cordially in everything I have asked you to do. I have not asked a single member to do anything for the good of the Association who has not cordially responded. I wish especially to thank my associates, your able Secretary and Treasurer, as well as the members of the Executive Committee, for their hearty support.

I will appoint Drs. Whitmore and Reynolds to escort the President-elect to the platform. (Applause.)

Dr. Cordier, the newly elected President, was warmly received in ascending the platform, and was introduced to the Association by Dr. Moyer in the following language:

You have been selected President of the Mississippi Valley Medical Association, an office of dignity, and one of which you ought to be proud. You have not been selected for your

size, nor for any peculiar manipulative skill that you have exhibited here. You have been selected as President of the Association because you are a representative physician, and because you are a good physician and a good surgeon. In this office you typify its functions. The old kingdoms used to say, "The King is dead; long live the King." We now think perhaps it sounds cruel and harsh, but the members of this Association do not say that the President is dead, but they say he acts, and long live the President. (Applause.)

Dr. Cordier, in accepting the Presidency, said: It is useless for me to tell you how proud I am of the honor you have conferred upon me by selecting me as your President for the next year. In accepting the honor you have so generously conferred upon me, it shall be my every effort to please you. It shall be my every effort to consult your wishes and to do what you say; at the same time, I shall appreciate very much any suggestions the members of the Society may see fit to make, in regard to the policy of my administration. I am your servant; I am here for nothing except to keep good order. We have in this Association members who have won national and international fame, and we have an organization of which we may feel justly proud. It is second only in size to the American Medical Association; it is second to none in the matter of scientific and actual good work done. (Applause.) It is true, we are limited in name, but actually we have no geographical limits. We must realize that we of the Mississippi Valley are located in a territory in which most of the contagious diseases enter the United States, and it not only devolves upon us to look after the interests of individuals within our borders, but the whole commerce of the Mississippi Valley, practically speaking, is within our grasp, and I assure you that if the commercial enterprises of this great valley were brought to realize the important function that is expected of us and which we are constantly carrying out, we would have no difficulty in securing a one-fare rate from the railroads all over this country. The railroads and other commercial enterprises have not fully appreciated the great work that is being done by this Association.

Time is valuable; we only have a few more hours in which to transact our business and to read papers, and I wish to say with reference to our meeting next year, that I shall appoint each member of the Association a committee of one to work for the interests of the organization, and ask you all not only to come yourselves, but to do missionary work among your professional friends when you return home. Tell them the good things we have, and bring them with you next year. If each of you will bring a new member next year, I assure you the Association will continue to grow and thrive as it has in the past. Of course, we must not be idle in this matter.

I do not know that I have anything further to say at this time, except to again thank you for the distinguished honor that you have conferred upon me. (Applause.)

Dr. Carl H. Andersen, of Chicago: I move that a vote of thanks be extended to the retiring President, Dr. Moyer, for his courtesy and for the impartial and efficient manner in which he has conducted this meeting, and I ask that we take a rising vote.

Seconded by Dr. Stein, and unanimously carried.

The reading of papers was resumed. Dr. Hugh A. Cowing, of Muncie, Indiana, read a paper entitled, "The Physician as a Sanitarian."

Dr. J. H. Taylor, of Indianapolis, Indiana, followed with a paper entitled "The Girl of Twelve," which was discussed by Drs. Barclay, J. A. Stucky, Learned, Buckman, Rosenthal, and Burns.

Dr. William F. Barclay, of Pittsburg, Pa., read a paper on "The Science of Philosophy and Art of Medicine," which was discussed by Dr. Buckman, and the discussion closed by the essayist.

Dr. R. A. Bate, of Louisville, Ky., followed with a paper on "Asthma," which was discussed by Drs. T. H. Stucky, Minor, Reynolds, Rosenthal, and, in closing, by the essayist.

Dr. T. D. Crothers, of Hartford, Conn., read a paper on "Curability of Inebriety by Medical Treatment."

Dr. W. H. Bates, of New York City, contributed a paper entitled "Further Observations on the Clinical Application of Suprarenal Extract."

This paper was discussed by Drs. Stucky (J. A), Bate, Stucky (T. H.), and the discussion closed by the essayist.

Dr. Edwin Rosenthal, of Philadelphia, Pa., contributed a paper on "The Clinical Value of Purgative Mineral Waters."

Dr. Dudley S. Reynolds, of Louisville, Ky., read a paper entitled "What the Law Requires of a Surgeon."

Dr. L. H. Warner, of Brooklyn, N. Y., read a paper on "Differential Leucocytosis."

Dr. T. H. Stucky, of Louisville, Ky., offered the following resolution:

Resolved, That the Association return its sincere thanks to the Committee of Arrangements, the local profession of Asheville, the manager of the Battery Park Hotel, and to the railroads for their many courtesies and kindnesses extended to us.

Dr. Buckman: I move the adoption of the resolution as offered. Seconded and carried.

The following resolution was offered by Dr. S. C. Stanton, of Chicago, and was unanimously carried:

Resolved, That the thanks of the Association be extended to Mr. W. H. Tayloe, Assistant General Passenger Agent for the Southern Railway Company, for courtesies extended to the Association and especially for his care for the comfort of the presidential party which was detained by accident and which would have been exposed to still greater delay and inconvenience but for his attention and thoughtfulness.

On motion of Dr. Dudley S. Reynolds, the Association then adjourned, to meet at Put-in-Bay, Ohio, in September, 1901.

MISSISSIPPI VALLEY MEDICAL ASSOCIATION.

CONSTITUTION.

ARTICLE I.—NAME.

This Association shall be known as the MISSISSIPPI VALLEY MEDICAL ASSOCIATION.

ARTICLE II.—OBJECTS.

The objects of this Association are to foster, advance and disseminate medical knowledge; to uphold the honor and maintain the dignity of the medical profession.

ARTICLE III.—MEMBERSHIP.

Membership in this Association shall be limited to members of the medical profession in good standing.

No one under sentence of expulsion, suspension or other disability in any regularly organized State, county, district or local medical society shall be eligible to membership in this Association during the existence of such disability.

All applications for membership shall be made through the Committee on Credentials. The annual dues shall be three dollars, payable at time of registration or upon presentation of bill by Secretary.

ARTICLE IV.—MEETINGS.

The regular meetings of this Association shall be held annually. The place of meeting shall be determined by the Nominating Committee; the time by the Committee of Arrangements and the Executive Committee jointly.

ARTICLE V.—OFFICERS.

The officers of this Association shall be a President, two Vice Presidents, a permanent Secretary, Treasurer, and a Chairman of the Committee on Arrangements.

ARTICLE VI.—DUTIES OF OFFICERS.

SECTION 1. *President*—The President shall preside at the meetings of the Association, and perform such other duties as parliamentary usage and the vote of the Society may require. He shall appoint on the morning of the second day of each annual session a Committee on Nominations, consisting of one person from each State represented at the meeting. The person first named in the list shall be Chairman. This Committee shall meet in secret session and proceed to choose by ballot all the officers to be elected for the ensuing year, and the place of the next annual meeting.

SEC. 2. *Vice Presidents*—The Senior Vice-President, or in his absence a Junior Vice President, shall assist the President in the performance of his duties, and in the absence of the latter, or at his request, shall officiate at all meetings of the general sessions. If the sessions of the Association are divided into Sections of Medicine and Surgery, the Senior Vice President shall be *ex-officio* Chairman of the Surgical Section, and the Junior Vice President shall be *ex-officio* Chairman of the Section of Medicine. In the subdivision of these two, or either one of the sections, they shall, on assembling for business, choose a presiding officer and a Recording Secretary. In all Section meetings records shall be kept of all proceedings, and reported to the next ensuing general session of the Association.

SEC. 3. *Permanent Secretary*—It shall be the duty of the Secretary to keep a list of the members and their addresses, to give notice of the meetings of the Association, to keep a record of its proceedings, to conduct its business correspondence, and perform such other duties as may be required. He shall receive all dues paid by members during the interval between annual meetings, and render an account of all such receipts to the Treasurer, on or before the first session of each annual meeting. He shall submit to the Executive Committee the names of the members who are in arrears, and when these are for two years the Council shall declare their membership forfeited. He shall receive annually the sum of $100 for his services.

SEC. 4. *Assistant Secretary*—It shall be the duty of the Assistant Secretary to assist the Secretary in the performance of his duties, and in his absence, or in case of any vacancy in that office, to act as Secretary *ad interim*.

SEC. 5. *Treasurer*—It shall be the duty of the Treasurer to receive and disburse all moneys belonging to the Association. He shall pay out no money except on warrants signed by the presiding officer. The funds of this Association shall in no case be devoted to any purpose other than the necessary expenses of the officers and standing committees, and for the publication of the Transactions.

SEC. 6. *Committee on Credentials*—The Committee on Credentials shall be composed of three members, all of whom shall reside at the place of the annual meeting. The Chairman of this Committee shall be appointed by the President; two members shall be appointed by the Chairman of the Committee on Arrangements. This Committee shall receive all applications for membership, and all dues from the registration of members at the annual meetings, and pay all funds so received to the Treasurer, taking his receipt from time to time as the payments are made.

SEC. 7. *Committee on Arrangements*—The Chairman of the Committee on Arrangements may choose as many assistants as he deems best, and appoint an Assistant Secretary, besides making all arrangements for the annual meetings.

SEC. 8. *Executive Committee*—An Executive Committee, consisting of all the Ex-Presidents, the President, and Vice Presidents, shall fill by appointment any vacancy in the offices and standing committees occurring in the interval between the annual meetings, and shall examine and audit the accounts of the Secretary and Treasurer for the past year, and report at the executive session of the Association on the second day of each annual meeting.

ARTICLE VII.—CHANGES IN THE CONSTITUTION.

This Constitution shall not be altered or amended, except the

proposed alteration or amendment be made in writing and read to a regular session of the Association, and receive at the next annual meeting the approval of a three-fourths vote of all the members present in general executive session.

BY-LAWS.

ARTICLE I.

The annual sessions shall be called to order by the Chairman of the Committee of Arrangements. The President, on taking the chair, shall call for the reading of the minutes of the previous meeting, and on the morning of each succeeding day of the annual sessions the following order of business shall be observed, after the reading of the minutes:

SECTION 1. Announcements of the Committee of Arrangements.

SEC. 2. Report of Secretary.

SEC. 3. Report of Sections and Sub-Sections.

SEC. 4. Communications from other societies.

SEC. 5. Reports of Committees. They shall be called in the following order: Committee on Credentials, Executive Committee. Committee on Nominations (during the morning session of the last day only).

ARTICLE II.

SECTION 1. The provisions of Article I of these By-laws shall apply to the first thirty minutes of each morning session.

SEC. 2. No essay or report shall be permitted to occupy more than twenty minutes without consent of the Committee of Arrangements, or the Association.

SEC. 3. Discussion of papers or reports presented shall be limited to ten minutes for each speaker, and no member shall speak a second time except with the unanimous consent of the Association.

SEC. 4. No essay, report or other communication presented to this Association shall be published in any but the regular medical journals without the consent of the Executive Committee.

SEC. 5. All questions of debate shall be decided in accordance with Cushing's Manual of Parliamentary Law.

ARTICLE III.

SECTION 1. All questions of ethics and differences between members shall be referred without debate to the Executive Committee, whose report shall be final.

SEC. 2. All questions of eligibility for membership shall be determined by the Committee on Credentials.

SEC. 3. No person shall be allowed to participate in the deliberations of this Association who has not registered as a member and paid all dues.

ARTICLE IV.

These By-laws may be amended by a two-thirds vote of all the members present, provided the proposed amendment shall be made in writing and read aloud to the Association on two consecutive days at any annual meeting.

ROSTER OF MEMBERS

Mississippi Valley Medical Association.

NOTE.—The figures following names in this list indicate the number of years that member is in arrears in his dues, (1) one year, (2) two years. P indicates the ex-presidents. This list was finally prepared DECEMBER 1, 1900, and payment of dues later than that date are not here recorded.

WM. C. ABALY, 1
Brown Block, Madison, Wis.
WM. A. ADAMS, 2
Equitable Bldg., St. Louis, Mo.
W. E. ALDERSON, 1
College Street, Russellville, Ky.
J. E. ALLABEN,
Masonic Temple, Rockford, Ill.
JOHN T. ALLEN, 1
Brownsville, Tenn.
FRANK ALLPORT, 1
92 State Street, Chicago, Ill.
C. P. AMBLER,
4 Temple Court, Asheville, N. C.
S. S. AMERSON, 2
Sullivan, Ky.
JOHN C. AMIS,
Fort Smith, Ark.
CARL H. ANDERSEN,
100 State Street, Chicago, Ill.
FRANK T. ANDREWS, 1
4589 Oakenwald Ave., Chicago, Ill.
W. A. ATCHISON, 2
132 N. Spruce St., Nashville, Tenn.
J. M. AULD, 1
100 State Street, Chicago, Ill.
C. S. BACON, 1
426 Center Street, Chicago, Ill.
J. VINCENT BACON, 1
1216 Diversey Block, Chicago, Ill.
H. L. BAIRD,
60 Patton Ave., Asheville, N. C.
JOHN B. BAKER, 1
Pontiac, Ill.
WM. L. BALLENGER, 1
100 State Street, Chicago, Ill.
A. J. BANKER,
723 Franklin Street, Columbus, Ind.
DAVID F. BANKS, 2
Jardonia, Tenn.
WM. F. BARCLAY,
1620 Fifth Avenue, Pittsburg, Pa.
WADE H. BARNETT, 2
Franklin, Tenn.
C. W. BARRETT, 1
438 LaSalle Avenue, Chicago, Ill.
J. F. BARTON, 1
Shawneetown, Ill.
R. ALEXANDER BATE,
Second and Burnett, Louisville, Ky.
S. R. BATES,
Muldrow, Ind. Ter.
W. H. BATES,
50 East 64th St., New York, N. Y.
S. WESTRAY BATTLE,
13 Church Street, Asheville, N. C.
J. M. BATTEN,
Downingtown, Pa.
WM. L. BAUM, 1
103 State Street, Chicago, Ill.
EMORY H. BAYLEY,
Lake City, Minn.
CHAS H. BEARD, 1
34 Washington, Chicago, Ill.
L. W. BEARDSLEY,
1023 N. Grand Ave., St. Louis, Mo.
J. S. BECK, 1
34 W. 5th St., Dayton, O.
WARREN L. BEEBE, 1
St. Cloud, Minn.
EDWIN BENTLEY,
617 Main St., Little Rock, Ark.
A. C. BERNAYS,
St. Louis, Mo.
ALBERT BERNHEIM, 2
5th & Broad, Paducah, Ky.
ARTHUR DEAN BEVAN, 1
100 State St., Chicago, Ill.
V. A. BIGGS, 1
Martin, Tenn.
W. C. BILBRO, 2
Murfreesboro, Tenn.
CARL E. BLACK,
Jacksonville, Ill.
B. H. BLAIR, 1
Lebanon, O.
GUSTAVUS M. BLECH, 1
1434 Michigan Ave., Chicago, Ill.
CHAS. E. BODDIGER, 1
2801 Archer Ave., Chicago, Ill.
J. LELAND BOOGHER, 1
Union Trust Bldg., St. Louis, Mo.
A G. BOUFFLEUR, 1
1178 Wabash Boul., Chicago, Ill.
J. WESLEY BOVEE,
1404 H St., Washington, D. C.
A. W. BOYD, 2
5 E. 8th St., Chattanooga, Tenn.
C. S. BRIGGS, 2
Summer & Union, Nashville, Tenn.

W. T. DODGE, 1
Big Rapids, Mich.
C. A. DAUGHERTY, 1
South Bend, Ind.
RICHARD DOUGLAS, 2
Nashville, Tenn.
J. E. DRAKE, 1
Lyceum, Tenn.
ANDREW B. DRAFTS,
Hendersonville, N. C.
C. TRAVIS DRENNEN,1
Hot Springs, Ark.
WM. LE ROY DUNN,
"Winyah," Asheville, N. C.
DARWIN D. EADS,
683 Washington Bld., Chicago, Ill.
B. BRINDLEY EADS,
683 Washington Bld., Chicago, Ill.
JOS. RILUS EASTMAN, 2
Indianapolis, Ind.
CHAS. P. EDWARDS,
Bold Creek, N. C.
G. P. EDWARDS, 2
Jackson Bldg., Nashville, Tenn.
JOS. EICHBERG, 1
1105 McMillan St., E. Cincinnati, O.
JAS. L. EGERTON,
Hendersonville, N. C.
G. S. ELLIS,
420 Cherry, Helena, Ark.
ROSA ENGLEMANN, 2
Hyde Park Hotel, Chicago, Ill.
R. B. EPTING,
Greenwood, S. C.
GEO C. ERWIN,
Young Harris, Ga.
A. P. BUCHMAN,
Fort Wayne, Ind.
H. B. BUCK (P), 2
Springfield, Ill.
JAMES B. BULLITT,
205 W. Broadway, Louisville, Ky.
F. E. BUNTS,
275 Prospect St., Cleveland, O.
ALFRED S. BURDICK, 1
Hinsdale, Ill.
WM. BRITT BURNS,
Deckerville, Ark.
C. B. BURR,
Flint, Mich.
JAS. A. BURROUGHS,,
Asheville, N. C.
GEO. F. BUTLER,
Alma, Mich.
GEO. W. CALE, JR.,
Springfield, Mo.
J. C. CAMPBELL,
Beaumont, N. C.
R. E. CARLTON,
Bethany, Ky.
LEA ORR CARRUTH,
Chesterville, Miss.
JAMES O. CARSON, 1
442½ Main St., Bowling Green, Ky.
S. C. CARSON,
Greensboro, Ala.
J. H. CARSTENS,
620 Woodward Ave., Detroit, Mich.
CHARLES W. CARTER,
107 S. College Ave., Aledo, Ill.
A. M. CARTLEDGE, 2
205 W. Broadway, Louisville, Ky.
GUY B. CASE, 1
114 Euclid Avenue, Cleveland, O.
WM. E. CASSELBERRY,
34 Washington Street, Chicago, Ill.
ANDREW B. CHAPIN, 1
143 Robertson, Mt. Clemens, Mich.

THOS. P. CHEESBOROUGH,
13 Church Street, Asheville, N. C.
W. S. CHRISTOPHER, 1
406 Center Street, Chicago, Ill.
J. V. CLEAVER,
635 West Market, Akron, O.
B. L. COLEMAN,
27 N. Mill Street, Lexington, Ky.
J. W. COLEMAN, 1
Union, Ind.
S. P. COLLINGS,
Hot Springs, Ark.
J. P. CONNELL, 1
Fond du Lac, Wis.
T. E. CONVERSE, 2
Fourth and Walnut, Louisville, Ky.
A. B. COOKE, 2
Church & Spruce, Nashville, Tenn.
GEO. J. COOK (P.)
Indianapolis, Ind.
A. H. CORDIER (Pres. 1901).
310 Rialto Bldg, Kansas City, Mo.
H. A. COTTELL, 1
1012 Fourth Street, Louisville, Ky.
CLYDE E. COTTON,
350 Jennings Avenue, Cleveland, O.
J. HOMER COULTER,
103 State Street, Chicago, Ill.
J. B. COWAN, 2
Tullahoma, Tenn.
HUGH A. COWING,
210 S. High, Muncie, Ind.
D. A. COX, 1
Evansville, Howell Sta., Ind.
J. M. COYLE, 2
426 Cedar, Nashville, Tenn.
F. W. CRAM,
Sheldon, Ia.
R. H. CRAMER,
New Cumberland, W. Va.
J. Y. CRAWFORD, 1
Jackson Bldg., Nashville, Tenn.
N. B. CRAWFORD, 1
Ureka, Ill.
SAMUEL K. CRAWFORD, 1
440 S. Hermitage Ave., Chicago, Ill.
ROBT. N. CREWS, 1
Williamsburg, Mo.
J. M. CRENSHAW, 1
Mount Washington, Ky.
GEORGE W. CRILE,
275 Prospect St., Cleveland, O.
THOS. D. CROTHERS,
Hartford, Conn.
J. C. CULBERTSON,
317 W. Seventh, Cincinnati, O.
WM. CUTHBERTSON, 1
4553 Ellis Avenue, Chicago, Ill.
STEELE DAVIS, 1
Cistern, Tex.
WM. C. DAVIS, 1
100 State Street, Chicago, Ill.
CHARLES DAVISON, 1
955 Jackson Bld., Chicago, Ill.
R. L. DAVIS,
Bryson, S. C.
ALLEN DE VILBISS, 1
1270 Jackson Avenue, Toledo, O.
RICHARD DEWEY,
Milwaukee Sanitarium,
Wawatosa, Wis.
EDW. T. DICKERMAN, 1
103 State Street, Chicago, Ill.
ARCH DIXON (P.), 2
Henderson, Ky.
WILEY LEE DIXON,
Morganfield, Ky.

H. H. BRIGGS,
237 York, New Haven, Conn.
PERRY BROMBERG, 2
629½ Church St., Nashville, Tenn.
J. G. BROOKS, 1
Paducah, Ky.
SAMUEL F. BROTHERS,
227 Madison St., New York, N. Y.
DANIEL R. BROWER, 1
34 Washington St., Chicago, Ill.
EVERETT J. BROWN,
Decatur, Ill.
SANGER BROWN, 1
Chicago, Ill.
C. B. BROWN, 1
Sycamore, Ill.
H. H. BROWN, 1
103 State St., Chicago, Ill.
JOHN YOUNG BROWN (P.), 2
530 N. Spring Ave., St. Louis, Mo.
W. C. BROWNSON,
60 Patton Ave., Asheville, N. C.
J. D. BROWNSON, 1
Elkader, Ia.
TRUMAN W. BROPHY,
126 State Street, Chicago, Ill.
CHAS. K. BRUNER, 1
101 W. Main Street, Greenfield, Ind.
RANDOLPH BRUNSON, 1
Hot Springs, Ark.
F. F. BRYAN,1
Georgetown, Ky.
E. H. BRYAN,
Slick Rock, Ky.
D. R. BRYSON,
Bryson City, N. C.
FRANKLIN W. ESKEY,
Prophetstown, Ill.
M. H. EVANS, 1
Spring Valley, Ill.
DUNCAN EVE (P.), 1
Nashville, Tenn.
PAUL F. EVE, 2
700 Church Street, Nashville, Tenn.
T. S. FAUCETT,
Burlington, N. C
HENRY B. FAVILL, 1
100 State Street, Chicago, Ill.
J. P. FERGUSON,
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I. W. FINK,
Fink's Bldg., Hillsboro, Ill.
T. D. FINCK,
Courier Journal Bldg.,
Louisville, Ky.
JOS. H. FIRESTONE,
162 Mechanic St., Freeport, Ill.
C. FISCH, 1
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RUSSELL G. FLOYD,
Eureka Springs, Ark.
ADDISON H. FOSTER, 1
779 W. Monroe, Chicago, Ill.
FRANK P. FOSTER,
16 E. 31st St., New York, N. Y.
WM. T. FOUTE,
Lenoir City, Tenn.
JACOB FRANK,
17 Lincoln Ave., Chicago, Ill.
W. E. FRASER, 1
5490 Washington Ave., Chicago, Ill.
J. A. FREEMAN, 1
Millington, Ill.
JOHN A. FREEMAN,
Beard, Ky.
LOUIS H. FRIEDERICH, 1
100 Clybourn Ave., Chicago, Ill.
JOHN W. FUQUA, 1
Urbana, Ill.
DAVIS FURMAN,
River St., Greenville, S. C.
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701½ Church St., Nashville, Tenn.
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Plattsburg, Mo.
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WM. FRANK GLENN,
Duncan Hotel, Nashville, Tenn.
ALBERT GOLDSPOHN,
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EARLE GRADY,
Tryon, N. C.
L. B. GRADDY, 2
Church and High Sts., Nashville,
Tenn.
D. W. GRAHAM, 1
67 W. Monroe St., Chicago, Ill.
W. ED GRANT,
W. Jefferson St., Louisville, Ky.
H. HORACE GRANT,
Warren Bldg., Louisville, Ky.
F. C. GREENE,
42 Wabash Ave., Chicago, Ill.
T. B. GREENLEY,
Meadow Lawn, Ky.
H. L. GREGG, 1
Silver Creek, Neb.
R. L. GROGAN, 2
Murray, Ky.
K. GRYTTENHOLM,
Zumbrota, Minn.
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EDW. A. HANNA, 1
7135 Union Ave., Chicago, Ill.
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103 State St., Chicago, Ill.
H. T. HARDY, 1
Kaneville, Ill.
W. M. HARSHA,
103 State St., Chicago, Ill.
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400 Jersey St., Quincy, Ill.
HARRY H. HATCHER, 1
107 W. 4th, Dayton, O.
A. M. HAYDEN, 2
427 Up. 1st St., Evansville, Ind.
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428 S. Wabasha St., St. Paul, Minn.
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Hot Springs, Ark.

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Coon Rapids, Ia.
ROLANDO H. HENRY, 1
Peotone, Ill.
SAMUEL L. HENRY,
Seven Gums, Ky.
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Friend, Neb.
CADWALADER HICKS, 1
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H. HOLMGREN,
Canton, S. D.
T. A. HOPKINS, 2
312 Century Bldg., St. Louis, Mo.
JOHN C. HOSHOR, 1
Rosendale, Mo.
C. HOSTELLER,
Marcus, Iowa.
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911 S. 9th St., Waco, Tex.
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Louisville, Ky.
J. B. JACKSON,
Hopkinsville, Ky.
T. J. JACKSON, 2
Liberty, Tenn.
C. C. JACOBS, 1
Frostburg, Md.
W. K. JACQUES, 2
103 State St., Chicago, Ill.
H. A. JEGI, 1
Galesville, Wis.
JOHN L. JELKS,
273½ Main St., Memphis, Tenn.
J. T. JELKS,
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J. O. JENKINS,
625 Isabella St., Newport, Ky.
G. W. JOHNSON, 1
Dunning Sub-Station, Chicago, Ill.
J. E. JOHNSON, 1
Lebanon Junction, Ky.
J. LIVELY JOHNSON,
201 W. Walnut, Louisville, Ky.
GEO. BEN JOHNSTON,
407 E. Grace St., Richmond, Va.
E. H. JONES, 1
Murfreesboro, Tenn.
FRANK A. JONES, 1
135 Hernando, Memphis, Tenn.
CHAS. S. JORDAN,
13 Church St., Asheville, N. C.
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1321 N. Delaware, Indianapolis, Ind.
A. E. KAUFMAN, 1
Parkersburg, Iowa.
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JANE REED KEEFER,
408 First Ave., Sterling, Ill.
GEO. E. KEIPER,
Lafayette, Ind.
FRANCIS D. KENDALL,
1309 Plain St., Columbia, S. C.
S. L. KILMER, 1
215 W. Jefferson, South Bend, Ind.
F. E. KELLY, 2
La Moille, Ill.
J. O. KIRBY, 1
Verona, Ill.
PAUL W. KIRKPATRICK, 2
Central Hospital for Insane,
Nashville, Tenn.
ARNOLD C. KLEBS, 1
100 State St., Chicago, Ill.
E. E. KLUTZ,
Troutman's, N. C.
GEO. KNAPP, 2
Vincennes, Ind.
J. W. KNOWLTON,
Paint Rock, Ala.
F. KREISSL, 1
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WILSON T. LAWSON, 1
Danville, Ind.
JOHN BARR LEARNED,
Northampton, Mass.
E. H. LEE, 1
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Fulton, Ky.

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M. B. McCRARY, 1
Woodbury, Tenn.
C. F. McGAHAN,
Aiken, S. C.
C. H. McKAIN, 1
Vicksburg. Mich.
L. F. McKAY, 1
Martin, Tenn.
P. W. McKEEL, 1
Wingo, Ky.
RICHMOND McKINNEY, 2
Continental Bldg., Memphis, Tenn.
N. M. McKITTERICK,
Burlington, Iowa.
L. S. McMURTRY, 1
1912 Sixth St., Louisville, Ky.
L. B. McWHORTER, 1
Cowan, Tenn.
JACOB C. MALSBURY,
Broadway and Main, Peru, Ind.
THOS. H. MANLEY,
115 W. 49th, New York, N. Y.
JACOB F. MARCHAND, 1
133 N. Cleveland, Canton, O.
FRANK B. MARSHALL, 1
Girard, Mich.
THOS. CHAS. MARTIN,
1077 Prospect St., Cleveland, O.
JOS. M. MATHEWS (P.),
923 Fourth Ave., Louisville, Ky.
WM. O. N. MENDENHALL, 1
120 S. 9th, Richmond, Ind.
WM. B. MEANY, 1
4th and Park Ave., Louisville, Ky.
MARIE J. MERGLER,
34 Washington St., Chicago, Ill.
F. T. MERIWETHER,
14 Grove St., Asheville, N. C.
SAML. E. MILLIKEN, 1
449 Elm St., Dallas, Tex.
C. L. MINOR,
65 French Broad Ave.,
Asheville, N. C.
E. B. MONTGOMERY, 1
134 N. 8th., Quincy, Ill.
JOHN C. MORFIT, 2
3565 Olive St., St. Louis, Mo.
EUG. R. MORRIS,
32 Patton Ave., Asheville, N. C.
JOHN DUKE MOTT, 1
Crider, Ky.
HAROLD N. MOYER (P.),
103 State St., Chicago, Ill.
J. B. MURFREE, 2
Murfreesboro, Tenn.
E. S. MURPHY, 2
25 St. Stecil St., Dixon, Ill.
J. B. MURPHY,
100 State St., Chicago, Ill.
G. P. NEEL,
Greenwood, S. C.
MARCUS A. NEWELL,
Sheridan, Wyo.
HENRY P. NEWMAN,
103 State St., Chicago, Ill.
PARKER NEWMAN, 1
438 La Salle St., Chicago, Ill.
WM. L. NOBLE,
400-100 State St., Chicago, Ill.
FRANK P. NORBURY,
420 W. State St., Jacksonville, Ill.
J. S. NOWLIN, 2
Shelbyville, Tenn.
A. J. OCHSNER,
710 Sedgwick St., Chicago, Ill.
A. W. OSNESS, 1
4th and Jefferson, Dayton, O.
WHYTE G. OWEN,
White Castle, La.
CHAS. E. PADDOCK, 1
103 State St., Chicago, Ill.
CHAUNCY D. PALMER,
Avondale, Cincinnati, O.
PAUL PAQUIN,
29 Haywood, Asheville, N. C.
C. B. PARKER,
425 Euclid Ave., Cleveland, O.
HUGH T. PATRICK,
34 Washington St., Chicago, Ill.
B. H. PAYNE,
18 W. Washington, Fort Wayne, Ind.
CHAS. L. PEARSON,
Asheville, N. C.
J. HUNTER PEAK, 2
1123 Highland Ave., Louisville, Ky.
C. I. PEASE, 1
Linn Grove, Iowa.
JULIUS F. PEAVY,
5 Haywood, Asheville, N. C.
G. S. PECK, 1
29 W. Federal St., Youngstown, O.
H. E. PELLE,
Louisville, Ky.
J. RAWSON PENNINGTON,
103 State St., Chicago, Ill.
W. D. PENNINGTON, 1
West Baden, Ind.
J. F. PERCY, 1
Galesburg, Ill.
REUBEN PETERSON,
103 State St., Chicago, Ill.
E. E. PERISHO, 1
Ancona, Ill.
E. S. PETTYJOHN, 1
Alma, Mich.
A. M. PHELPS,
62 E. 34th, New York, N. Y.
K. S. PIATT, 1
Avalon, Mo.
NORVAL H. PIERCE, 1
31 Washington St., Chicago, Ill.
W. F. PIERCE, 1
Carson, Iowa.
WM. HENRY POOLE, 1
270 Woodward Ave., Detroit, Mich.
CURRAN POPE,
W. Chestnut St., Louisville, Ky.
IRA W. PORTER, 1
216 Sheely Block, Omaha, Neb.
JOHN L. PORTER, 1
103 State St., Chicago, Ill.
WM. PORTER (P.), 2
St. Louis, Mo.
JAS. M. POSTLE,
Hinckley, Ill.
T. K. POWELL, 2
Dancyville, Tenn.
PORTER PRATHER, 1
Asylum, Lexington, Ky.
GEO. R. PROCTOR, 1
Coleta, Ill.
JOHN PUNTON, 1
Altman Bldg., Kansas City, Mo.
G. W. PURIFOY,
27 Charlotte St., Asheville, N. C.
W. A. PUSEY, 1
103 State St., Chicago, Ill.

WM. A. QUINN, 2
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A. RAVOGLI,
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JOHN L. RAY,
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MOREY L. REED, 1
320 Bowen St., Chicago, Ill.
C. A. L. REED (P.), 3
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G. W. REED,
1 Swan, Biltmore, N. C.
CARL V. REYNOLDS,
23 Woodfin, Asheville, N. C.
DUDLEY S. REYNOLDS,
306 W. Chestnut, Louisville, Ky.
E. H. RICHARDSON,
12 Kimball, Atlanta, Ga.
W. M. RICHARDSON,
La Tour, Ark.
R. H. C. RHEA, 2
Morganfield, Ky.
JOHN RIDLON, 1
Chicago, Ill.
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Assumption, Ill.
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297 Ashland Bldg., Chicago, Ill.
R. F. ROBINSON, 1
Egan, S. D.
S. J. ROLLOW, 2
Kennedy, Ky.
ELIZA H. ROOT,
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EDWIN W. RYERSON, 1
103 State St., Chicago, Ill.
ALLEN SALTER,
Lena, Ill.
ENNO SANDER,
129 S. 11th St., St. Louis, Mo.
WILLARD C. SANFORD,
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H. EDWARD SAUER, 1
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GEO. H. SIMMONS,
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H. M. SKILLMAN,
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M. M. SMITH, 1
Austin, Tex.
RICHARD R. SMITH,
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Grand Rapids, Mich.
OLAF SOHLBERG, 1
7th and Pine, St. Paul, Minn.
LEON L. SOLOMON, 1
323 W. Walnut, Louisville, Ky.
D. A. STANTON,
High Point, N. C.
S. C. STANTON,
34 Washington, Chicago, Ill.
T. P. STANTON, 1
Charlton, Iowa.
HORACE M. STARKEY, 1
70 State St., Chicago, Ill.
J. H. STEALEY,
Freeport, Ill.
O. J. STEIN,
100 State St., Chicago, Ill.
ALBERT E. STERNE,
Indianapolis, Ind.
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Trenton, Ky.
JAS. B. STEPHENS, 2
High and Union, Nashville, Tenn.
EDWARD S. STEVENS, 1
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DAVID W. STEVENSON,
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5½ E. 8th St., Chattanooga, Tenn.
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Asheville, N. C.
JACOB WALDSCMIDT,
St. Cloud, Wis.
ALONZO B. WALKER, 1
319 Tuscarawas St. W., Canton, O.
H. O. WALKER (P.),
25 Adams Ave. E., Detroit, Mich.
EDWIN WALKER,
Evansville, Ind.
SAML. J. WALKER, 1
34 Washington St., Chicago, Ill.
WM. S. WALKER,
613 Ferry St., La Fayette, Ind.
JOHN EDW. WALTON, 1
Medora, Ill.
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Bordley, Ky.
J. HOWELL WAY,
Waynesville, N. C.
H. BASCUM WEAVER,
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W. J. WEAVER,
Marshall, N. C.
EDMUND B. WEBB,
Andrews, N. C.
GEO. W. WEBSTER,
70 State St., Chicago, Ill.
J. P. WEBSTER,
60th St. and Stewart Ave,
Chicago, Ill.
F. W. WERNER,
503 Jefferson St., Joliet, Ill.
E. P. WEST,
Clarksville, Ga.
H. R. WEYANT,
532 W. Dauphin, Philadelphia, Pa.
C. A. WHEATON,
5th and St. Peter, St. Paul, Minn.
HENRY C. WHELCHEL,
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25 Vance, Asheville, N C.
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JOHN R. WILLIAMS, 1
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EDWIN F. WILSON, 1
230 E. Long, Columbus, O.
W. N. WISHARD (P.),
224 N. Meridian St.,
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209 S. High St., Nashville, Tenn.
JOHN H. WOODCOCK,
Patton Ave., Asheville, N. C.
E. W. WOODRUFF, 2
255 W. 5th Ave., Columbus, O.
THOS. M. WOODSON, 2
Gallatin, Tenn.
JAS. A. WORK, 1
300 Division St., Elkhart, Ind.
SAMUEL M. WYLIE, 1
Paxton, Ill.
HAL C. WYMAN,
46 Adams Ave. W., Detroit, Mich.
PHILIP ZENNER,
14 Glenn Bldg., Cincinnati, O.

LIST OF MEMBERS

dropped from the roll by the Executive Committee at Asheville, 1900; being in arrears two years in their annual dues. They can only be re-instated upon full payment of all arrears from 1898 to time of renewing application.

H. K. ADAMSON,
Maysville, Ky.
BEN A. ALLAN,
Louisville, Ky.
M. S. ALLEN,
Stithton, Ky.
E. O. ALLHANDS,
Louisville, Ky.
WM. H. ANDERSON,
Sardis, Ky.
W. O. BAILEY,
Louisville, Ky.
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